

# THE IRON AGE

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## Material Handling Features Ohio Foundry



Arrangement of Storage Yard, Loading Platform, Cranes and Magnets Facilitates Production — Capacity for Castings up to 50 Tons

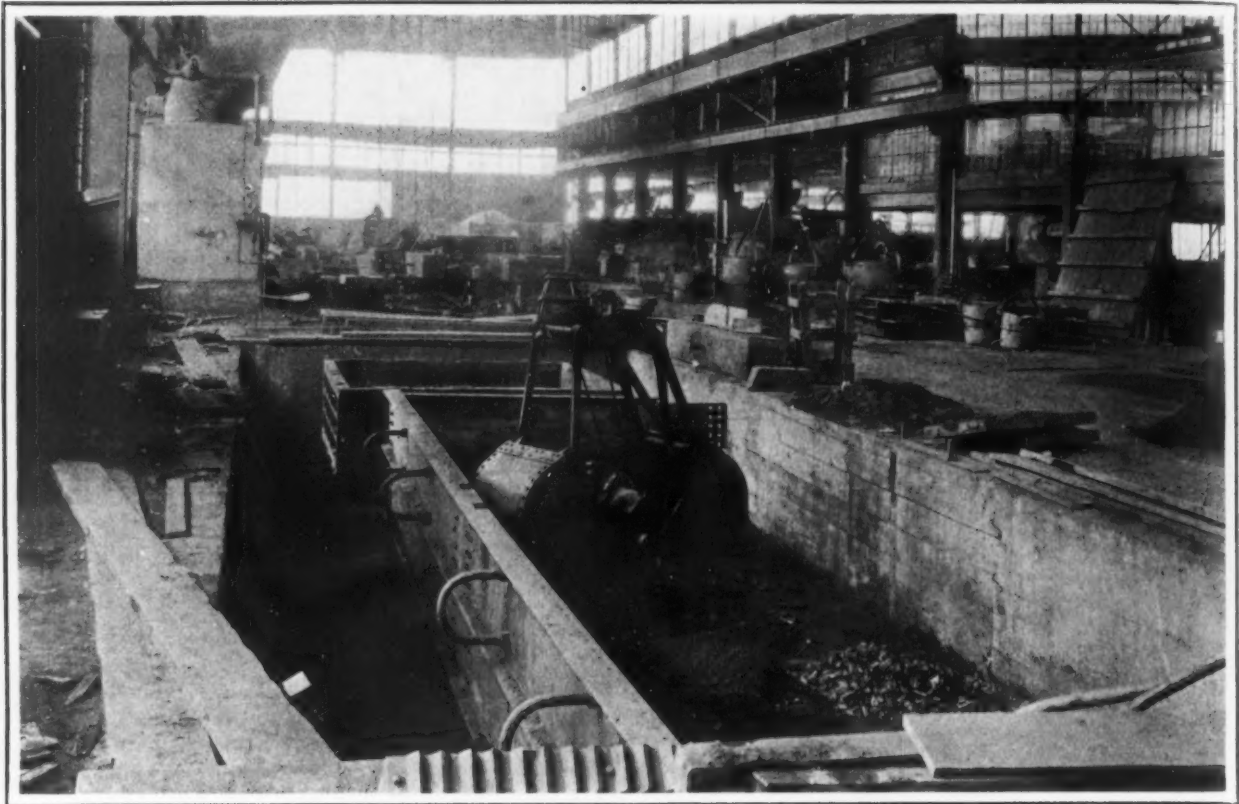
**A** FOUNDRY building well equipped to handle castings weighing from one ounce up to 50 tons is now in operation at the plant of the Long & Allstatter Co., Hamilton, Ohio. This company is one of the leading manufacturers of punches and shears in the United States and is preparing to branch out into the manufacture of other heavy machine tools.

The foundry is constructed of steel and concrete with windows set in steel sash on all sides, giving good daylight lighting. The main building is 90 x 371 ft.; the lockers and wash room, cleaning room and flask yard is 45 x 371 ft. and the pig iron and coke storage yard is 40 x 371 ft. The building is located between the main lines of the Pennsylvania Railroad on the east and the B. & O. on the west, an ideal location for receiving and shipping purposes. The most modern equipment has been installed, and special provision made for handling heavy work.

The heavy cores are rammed on top plates 8 x 12 ft., placed on trucks making rolling unnecessary. These trucks are located on tracks directly in front of two 20 x 30-ft. gas-fired core ovens. Wherever possible, pit work is favored and for this purpose a large pit, 50 x 20 ft. and 6 ft. deep, has been constructed of concrete. Provision is made for blocking off this pit to any desired size.

For handling materials, two 30-ton Whiting cranes and one 10-ton Northern crane have been installed. A clam shell bucket is used for handling sand. A 5-ton Northern crane is also installed in one wing of the building devoted to flask storage.

For handling raw materials in the pig iron and



Concrete Pit, 50 x 20 Ft., Which Can Be Blocked Off to Any Desired Dimension. Sand is handled by the clam shell bucket shown in the pit

coke storage yard, a 10-ton crane is used. The crane is equipped with a magnet for handling pig iron and the runway extends out over both railroads between which the plant is located. A clam shell bucket is used for unloading sand, which is dropped through a hatch in the roof of the wing of the building into a storage bin. This storage bin later will be placed underground.

The crane used in unloading raw materials also serves the charging platform which is constructed of concrete. Pig iron and scrap material are taken from the storage yard and deposited on the platform by a magnet. The raw materials are weighed on this platform and then placed on truck platforms which are conveyed by elevating trucks to the charging floor and lined up in the order in which they are to be charged to the cupola. Below the

charging floor and entirely inclosed by glass is the blower room. Installed here is a No. 6 direct connected Roots blower, and a motor driven Laidlaw air compressor, which keeps a constant pressure on the air receiver of 85 lb. There is also a General Electric centrifugal compressor with a variable speed motor. At the other end of the blower room is located the stock room, where all small supplies used in the foundry are stored. These supplies are issued only on requisition of the superintendent, and an accurate record of material costs is thus easily recorded. The blower room is a model of cleanliness, and the fact of its being entirely inclosed by glass keeps it practically free from dust so generally found in foundries.

Two cupolas are now in use, one No. 5 and one No. 7 Whiting, and provision has been made for the



Core Box on Truck in Foreground; Second Truck Shows Finished Core. These pocket cores are all hung from the cover core, really consisting of five cores combined into one. Large cores are rammed on plates as shown



Interior View of Foundry Showing the Good Lighting Arrangement. The glass inclosed compressor and blower room is also shown

installation of a 90-in. cupola when this becomes necessary. The heating is taken care of by three units of the Skinner Bros. heating system, and the Cooper Hewitt lighting system is used throughout. A Plymouth gasoline truck is used for conveying material between the storage yards and foundry floor. In connection with the foundry is a modern welfare building containing a well appointed first aid room. Individual lockers are furnished, also shower baths and wash basins with hot and cold water.

The output of the foundry is now 1300 tons of castings a month and this will be increased when the new cupola is installed.

#### French War Output of Munitions

In an account of the production of iron and steel in France published by the *Comité des Forges*, it is stated that during the war France equipped practically the whole of the Serbian army, says the *London Iron-monger*. She also supplied large quantities of rifles,

machine guns, and heavy cannon and munitions to Russia, Greece, and Rumania, and made all the light artillery and a large number of heavy batteries for the American army. The output of shells for the 75 mm. guns, which according to the program of mobilization at the beginning of the war was to be 10,000 a day, rose to 150,000 per day at the beginning of 1916 and to nearly 300,000 in May, 1917. The output of 155 and 220 mm. projectiles, of which only 200 per day were produced at the beginning of the war, rose to 50,000 a day in 1917 for the first-named, and to 30,000 for the latter. The manufacture of heavy artillery was only taken up in 1916, but at the time of the armistice more than 6500 heavy pieces of artillery had been delivered. At the end of the hostilities France was constructing 60 guns of all calibres per day. The manufacture of rifles was increased in the proportion of one in 1914 to 290 in 1918, and that of machine guns of one to 170.

Three of the new tinplate mills built by the Bethlehem Steel Co., Sparrows Point, Md., have been put in operation. More will be placed in operation within a short time.



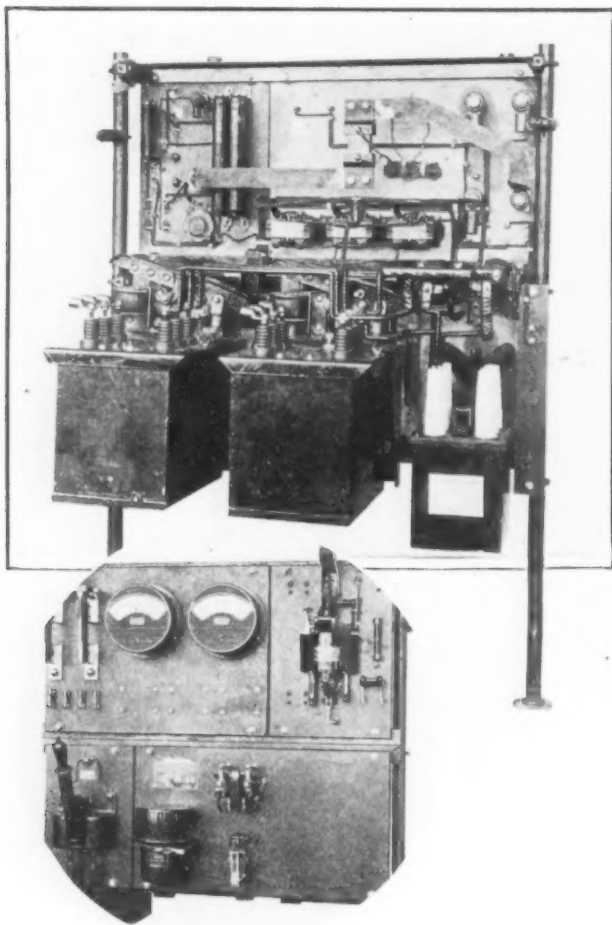
Planer Bed Casting After Being Pulled Out of Sand, Showing Cores and Method of Gateing



## Automatic Control Panel for Motor-Generator Sets

An automatic control panel for use in mines and other places where the direct current supply is obtained from a motor-generator set, has been placed on the market by the Cutler-Hammer Mfg. Co., Milwaukee. This equipment is explained as having all the protective features used in the small modern switchboard and may be controlled from any remote point by an ordinary snap switch, thus to eliminate the necessity of an attendant at the switchboard.

The equipment consists of the necessary circuit breakers, switches, relays, fuses and recording instruments mounted on slate panels carried on a floor type frame. The primary equipment of the control panel consists of a hand-operated oil circuit breaker provided with inverse time overload attachments, a phase failure and phase reversal relay, and an automatic starter



Automatic Control Panel for Use in Mines and Other Places Where the Current Is Obtained From a Motor-Generator Set. It is operated from any remote point by a snap switch, thus to eliminate the attendant at the switchboard.

of the auto-transformer type. This is to be used with induction motors, but the same general equipment with a few slight changes can be used with motors of the synchronous type. On the direct current side a knife switch, voltmeter and ammeter with the necessary fuses, and an automatic reclosing circuit breaker are provided.

The oil switches used on this equipment were described and illustrated in THE IRON AGE, issue of Jan. 8, page 132. They consist of an operating magnet of the clapper type, which is mounted on the supporting frame of the switch and drives the switch mechanism by means of a connecting rod extending through the top of the case. Both the stationary and moving contacts of the switch are carried on square insulated shafts and are readily accessible.

The control panels are furnished in different capacities up to 300 kw., and when so desired can be built for operating two motor-generator sets in parallel.

## Taylor Society at Rochester

The spring meeting of the Taylor Society, devoted to scientific management, will be held in Rochester, N. Y., May 6, 7 and 8, the headquarters of the society being maintained in the Powers Hotel, 36 West Main Street. Information as to hotel accommodations, etc., may be secured from B. M. Taylor, secretary to the managing director, 29 West Thirty-ninth Street, New York. The following is the preliminary program:

Thursday, May 6, 8.30 p. m., informal reception at the Rochester Club, 120 East Avenue.

Friday, May 7, 9.30 a. m., lecture room, Memorial Art Gallery, University of Rochester, University Avenue near Prince Street, Henry S. Dennison, president Taylor Society, presiding: 1. "The Necessity of Planning in Administration," by J. William Schulze, J. William Schulze Co., New York. 2. "Balance of Work," by William D. Hemmerly, resident engineer, Thompson & Lichtner Co., Boston and New York. 3. "Administration in Rochester," by Henry T. Noyes, general manager Art in Buttons, Inc., Rochester.

Friday, May 7, 7.30 p. m., ball room, Powers Hotel: 1. "The Promulgation of Standards by the Taylor Society," by William O. Lichtner, Thompson & Lichtner Co. 2. "The Necessity of Standards of the Relation Between Illumination and Output," by Ward Harrison, Illuminating Engineers, Cleveland.

Saturday, May 8, 9.30 a. m., ball room, Powers Hotel: 1. "Can Industrial Democracy Be Efficient; the Rochester Plan," by Dr. Meyer Jacobstein, labor manager Stein-Bloch Co., Rochester. 2. "The Worker's Reaction to Scientific Management," by Dr. William R. Leiserson, chairman labor adjustment board, Rochester Clothing Industry.

Saturday, May 8, 2 and 4 p. m., banquet room, Chamber of Commerce Building, 55 St. Paul Street: Round table conferences on phases of management.

Saturday, May 8, 6.30 p. m., Chamber of Commerce banquet hall: Joint dinner of the Taylor Society and the Rochester Chamber of Commerce, with address on "The Industrial Problem" by Ernest Martin Hopkins, president Dartmouth College.

## Package Machinery Company Enters Machine Tool Field

The Package Machinery Co., Springfield, Mass., is about to enter the machine tool field through the placing on the market of a bench lathe. The company specializes in automatic machines for wrapping products, such as candy, razor blades, chewing gum, soaps, cigarettes, etc. The wrapping machines are intricate in design, the parts often being as fine as those employed in the art of watch-making, and demand accurate machine tooling. A bench lathe therefore is quite a departure from the company's regular line of product.

The management, in building up its present organization of skilled machinists, has endeavored to hold it by various methods. The chief inducement offered has been stock ownership. For the past three years the company has given each employee two shares of common stock, par value \$50, when the employee rounds out a year of service. A dividend of 4 per cent per annum is paid on the common shares. Six years ago 42 machinists were employed; to-day there are more than 400, and of these 58 have been with the company more than five years.

The company has in force a system of production which provides for the assembling of machine parts on hand trucks. These trucks are all numbered. One is assigned to a machine to be made, and is moved from one department to another until each part needed in the construction of its particular machine is accounted for. The truck is then placed in "storage," there to remain until the assembly department is ready to put the machine together.

## Anti-trust Cases Postponed

WASHINGTON, April 6.—Arguments on seven anti-trust suits now pending before the United States Supreme Court will be postponed until next fall. This action has been decided upon in order to give the Department of Justice time to study the recent decision adverse to the Government in the United States Steel Corporation case.

The seven cases before the Supreme Court include the Anthracite Coal Trust cases, which were argued last fall, and cases involving the Eastman Kodak Co., the Associated Bill Posters and Distributors of the United States and Canada, the American Can Co., Quaker Oats Co., the Southern Pacific and the Keystone Watch Case companies.



# Heavier Equipment for All Mining Work

Marked Tendency of the Lake Superior Region—Larger Ore Cars—Advisability of Using Machine Power to the Limit—Oliver Iron Mining Co. Very Active

HERE is a very marked tendency toward heavier equipment for all mining work in the Lake Superior district; where 65-ton shovels, 50-ton locomotives and 7.5-yard stripping cars were the standard on the Mesabi range, 300-ton shovels, 100-ton locomotives and 30-yard cars are either in common use or are coming along this year. The Oliver Iron Mining Co., Butler Bros., and Winston-Dear, big stripping operators, are figuring on 30-yard stripping cars for 1920 delivery, and all of them are now using the 300-ton revolving shovels. The Oliver company is taking over 8-driver locomotives weighing 100 tons on the drivers, for use in their pits for handling stripping and ore. This means more permanent trackage in the pits, heavier rails, etc. All this tends toward efficiency and fewer men per ton of product. While there is no especial fear of labor troubles in the mines this season and no apparent tendency that way, no one can tell what may come; and there is a fairly grounded assurance that labor will not be overplenty, at the best. It behooves all the mine operators of the region to do as much by machine as possible.

## Great Northern Cars

A step in this same direction toward size and added efficiency is the contract just given by the Great Northern road for 1000 ore cars of the usual type, but of 70 gross tons capacity, rather than about 50, as customary. This road was pulling 120 loads of the usual size behind Mallet engines, from its assembling yards on the range to its docks, but found this too great a load for drawbars and reduced the number somewhat. It will probably pull about 7000 tons of revenue load per train when these new cars get into service. The present freight rate from mines to Lake docks is \$1 per ton; a raise from 65c when the Government took over the roads, and from the base of 55c, in force for some years prior. Shippers are evincing considerable interest in the rates, especially since the passenger fares on Mesabi range roads have been cut from the Government's 3c per mile to the 2.5c before the war rate. A cut to 65c on ore would mean a difference of not far from \$17,500,000 from Minnesota ore shipped during 1920. Just to whom this difference would accrue is a question; according to all precedent it would be demanded by the ore buyers, probably with success.

## New Producer

A new Vermilion range producer will be Phoenix mine, situated six miles northeast of Soudan mines of the Oliver company. This is the old Consolidated Vermilion property, opened under the supervision of T. J. Walsh, one of the old timers of the range, whose attempts were unfortunately handicapped by bad mining on the part of subordinates, so that the mine was wrecked at the time when it was getting into ore. Its ore is soft, high grade, and non-bessemer, and shipments this year will amount to nearly 20,000 tons. It looks as though the property may be an important shipper. There is no royalty on this ore, Phoenix company owning the fee to the property.

About half way between Soudan and this Phoenix is an exploration on Armstrong bay, section 18-62-14, now under the charge of a Cincinnati syndicate which is also attempting the development of a part of Section 30, at Ely. A very large sum has been spent at the latter operation, but so far with little result, either of ore or openings. The only other new exploration on the Vermilion is that of the McComber property, section 14-62-14, where a small syndicate of livestock men and country bankers is trying to develop a mine on a property that, like the rest of the Vermilion district, deserves and requires careful and studied atten-

tion, but is doing this without any assistance from engineers. It is customary that most new work of the Vermilion is carried on by people who have little mining experience and no geological knowledge, and who feel that this is unnecessary. The Vermilion is in reality a region of particularly complex and difficult geology, and mine opening presents an unusual number of problems, both in geology and in handling the details of work. The operators of Phoenix, however, are Messrs. Butler and Kennedy, one of whom is an experienced mine contractor and the other an engineer of ability and resource.

## Opening and Stripping

The Oliver Iron Mining Co. is doing a great amount of work in opening mines and is stripping from older properties; all winter it has maintained a steady stripping rate at mines of the Mesabi amounting to about 2,000,000 yards; it has just let a contract for the stripping of Bovey-Judd, section 27-56-24, amounting to 2,500,000 yards; it is stripping Sweeney, sections 3 and 4-57-21, and will begin shipments therefrom this season; it is opening Wellington mine, section 29-58-20, and will make some slight shipment this year. This ore body is very thin—from 12 to 18 ft., in which it is similar to much of the ore in that immediate vicinity, and long rock drifts will be run from the shaft to develop its ore. The company is planning a very marked extension to its hydro-electric power on the Quinnesec, near Iron Mountain, Mich., which, if carried out will mean a new investment there of about \$3,000,000. The present dam will be raised some 40 feet and the power plant greatly increased. Most of its mines in that district are now driven by this power. It is but a very few years since this company began the installation of electric power for its mines, and it is planning much of this sort of work at other points in the Lake region.

Cleveland-Cliffs Iron Co. has let a contract for stripping its new Boeing mine, section 6-57-20, adjoining Susquehanna on the south, and will remove some 6,000,000 yards of overburden. In the review of Lake Superior iron mining, printed in the IRON AGE Jan. 1, mention was made of a large low grade heavy stripping property that probably was to be opened for shovel mining after the engineers had figured out that the cost of open pit and underground work was about the same. This was the property then referred to. This overburden is 130 to 140 feet thick, similar to Susquehanna, and the mine cannot ship this year.

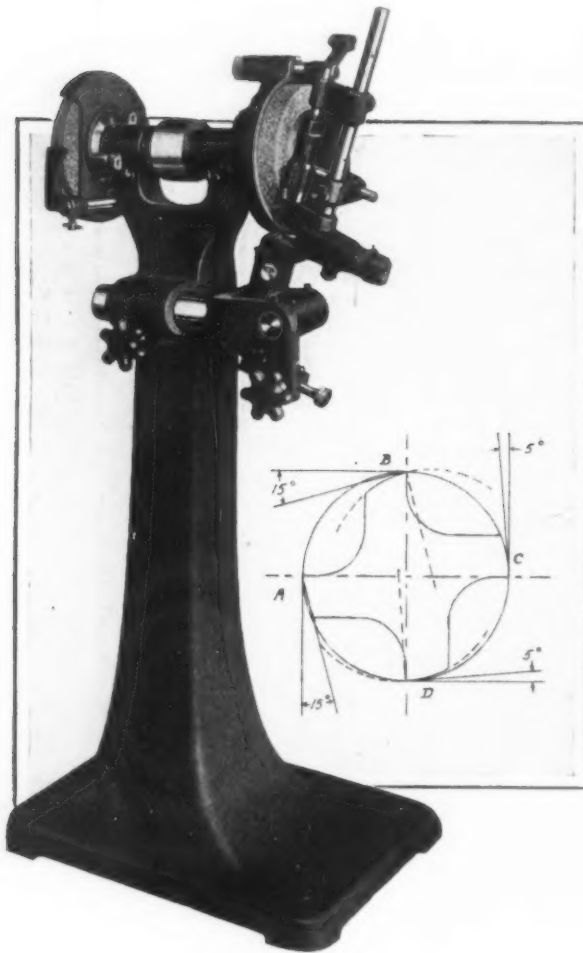
## Concentration of Lean Ores

John D. Gilchrist, of Denver, formerly mine superintendent for the Colorado Fuel & Iron Co., was in the western Ontario country a good deal during the past year, looking into the lean magnetites of that region with a view to their concentration. He examined the Mattewin, Steep Rock lake, and Atikokan formations and tested large samples for beneficiation. He now returns to Port Arthur, Ont., and makes a proposition to that municipality and to Fort William that they raise a fund of \$40,000 for the erection and operation of a test mill, to try out these ores, preliminary to building a commercial mill, as well as a blast furnace plant and steel works, to utilize these ores. He states that his preliminary experiments have been entirely successful, and that a concentrate of 55 per cent or better can be produced commercially. It is probable that the desired fund will be raised. Mattewin range contains a slaty, lean magnetite that concentrates easily; Steep Rock lake a silicious hard ore, and Atikokan a high sulphur ore, almost a pyrrhotite, attempts to make pig iron out of which so far have failed.

## Machine for Grinding Taps

A machine for grinding taps has been developed by the Grand Rapids Grinding Machine Co., Grand Rapids, Mich. By grinding a tap is meant grinding the taper at the end of the tap and the clearance back of the cutting edge thus formed. This taper, it is explained, may be long as in nut taps, short as in plug taps, or almost none as in bottoming taps, but the principle remains the same in each case, in that each flute should have exactly the same angle of taper, just enough clearance or backing off so that it will cut freely and not too much, which would unnecessarily weaken the cutting edge.

The machine shown in the accompanying illustration



Grinding Machine for Taps From  $\frac{3}{8}$ -in. up to 3 in. in Diameter. The tool grinds the taper at the end of the tap and the clearance back of the cutting edge

tion will take taps from  $\frac{3}{8}$  in. up to 3 in. in diameter. The tap is mounted between centers, swung into the proper grinding position against the moveable stop, and then the holder oscillated while the tap is in contact with the wheel. A spring tooth rest provides for indexing from flute to flute. In addition to the time saved over hand grinding, it is claimed that less power is required in cutting with taps ground on the grinder over those ground by hand, also they stay sharp longer. Any desired angle of entrance taper at the point of the tap can be obtained and all flutes, it is stated, will be the same no matter whether they be as few as two or as many as eight. Either right or left-hand taps can be ground. All taps with the possible exception of some sorts of stay-bolt taps, it is stated, can be handled on the grinder, and the threads may be U.S.S., V., S.A.E., Acme, square, etc.

The line drawing shows a section of a four-flute tap with each flute ground differently in the matter of clearance or backing off. The flute A is ground with a straight line clearance just sufficient so that it will have the heel of the flute actually clear and not drag. This calls for 15 deg. The manufacturer explains that general practice recognizes that this is excessive

and will weaken a cutting edge, but with a straight line clearance less cannot be had and still have clearance at the heel, if the flute is as wide as shown in the diagram, and some are wider in proportion to diameter. The flute B shows a 15 deg. convex clearance. That this is excessive can be seen more readily than with the straight line clearance. Flute C is ground with a straight line clearance of 5 deg. and shows that nearly half of the flute at the back is not cleared at all, leaving the tap to "ride" on that portion and keep the front of the flute from cutting at all. Flute D shows a perfect grind for ordinary work. It is a 5 deg. convex clearance and shows that with this small but sufficient clearance angle at the cutting edge, the back is perfectly cleared.

The convex clearance provided with Grand Rapids tap grinders is in the form of an arc of a circle, struck from a point on a radius laid out at a predetermined angle, in relation to the radius which forms the cutting face of the flute. In the case of flute D this angle is 5 deg.; in flute B it is 15 deg.; the dotted lines show the angle and also the arc of the circle thus provided for.

## New Employees' Building for Taylor Company

In accordance with its general policy for the social welfare of its employees, the N. & G. Taylor Co., Philadelphia, maker of tin plate, has formulated plans for extensive additions at its plant at Cumberland, Md.

The present employees' club house, designed to serve as a restaurant and also as a suitable gathering place for entertainment and recreation, has proved inadequate in size. It has been decided to devote it entirely to restaurant purposes, and to construct a larger building adjoining to house the social activities already in operation or in prospect. The new building will combine the purposes of an auditorium, a gymnasium and a dance hall. The main floor will be clear of supports and with ample head room for basket ball games. At one side will be a spectators' gallery two stories in height, and running the entire length of the building. The floor will be of maple, suitable for dancing. Ample windows by day and high-powered electric lights at night will furnish sufficient light at all times. Entrance will be by double doors from the club house and stairs at either end will lead to the upper galleries. Suitable lockers, shower baths and lavatories will be provided. The foundations have been excavated, materials for the concrete are on the ground, and it is expected the building will be opened with a general reception early in May.

## New Size Badger Disk Grinder

A new size single spindle disk grinder known as the No. 4, is announced by the Badger Tool Co., Beloit, Wis. Construction details are similar to those of the company's No. 6 grinder which was described in THE IRON AGE issue Aug. 7, 1919, page 364. The No. 4 machine has a disk wheel capacity of 18 in. diameter, cylinder chuck capacity of 14 in. diameter and a spindle 2 in. in diameter, whereas the No. 6 grinder has a disk wheel capacity of 20 and 24 in., cylinder wheel chuck capacity of 14 in.-16 in., and spindle diameter 2  $\frac{3}{16}$  in. The weight of the new machine complete with countershaft and press is 2300 lb. which is contrasted with a shipping weight for the No. 6 machine of 3100 lb. The grinder can be furnished with dust hoods for dry grinding and also with guards, pump and connections for wet grinding. A feature of these machines is the lever feed table which was described in detail in the Aug. 7 issue. The usual equipment for the No. 4 machine is one disk wheel and one cylinder wheel chuck, right-hand universal lever feed table and left-hand plain table.

The Society of Automotive Engineers, 29 West Thirty-ninth Street, New York, announces a summer meeting to be held at Lake Michigan, June 22 to 25. The sessions will cover standards in business, fuel, transportation, farm power and production. A program of sports and recreation has been arranged.

# Italian Steel Industry Seriously Handicapped

## Scarcity of Coal and Low Value of Lira Restrict Operations—The Fiat Company's Austrian Steel Plant—Little Buying of American Steel

(Special Correspondence)

MILAN, ITALY, March 14.—Industrial conditions in Italy are in practically the same state as at the beginning of 1919, when the Peace Conference was called at Paris. The programs for the shifting of manufacturing plants from a war to a peace footing were worked out long ago, but to only a slight extent could they be put into execution on account of the difficulty of acquiring the raw materials, the lack of coal, and the restlessness of labor. The government, as the war ended, too hastily relinquished its disciplinary rein on labor and its agents. There should have been a quiet period of transition to give time to the industries for readjustment and transformation.

The lack of coal, rendered more serious by the failure of winter rains, which has considerably lessened Italy's hydraulic power, is the main reason for the present industrial uneasiness. The demand for finished material of every kind is such that if the Italian mills had sufficient coal for working, the economic equilibrium would soon be established and industry would be prosperous to an unusual degree.

Little heed should be given, however, to the exaggerations which appear now and then in the American and European press in regard to Italy's internal political condition. Labor has now obtained all the advances it was demanding and has now no desire for political revolution.

It wants to work with continuity in order to consolidate the fruits of its economical conquests. The foreign press enlarges upon any local disorder in Italy, giving the idea that the country is on the verge of a great revolution. The purposes of such exaggerations are manifest.

### Steel Prices Above War-Time Levels

With the enormous increase in the rates of foreign exchange and the consequent high cost of the raw and finished products which Italy must import from abroad, also in view of the increase in the wages, the prices of finished steel have soared higher than those reached during the war. But also these high prices are often only nominal, because for spot material unbelievable prices are being paid. Here are shown the prices for some of the common raw and finished products, the conversion into dollars being at the rate of 20 lire:

Heavy melting steel scrap, 350 to 450 lire per ton, or \$17.50 to \$22.50.

Hematite pig iron, 1000 lire per ton, or \$50.

Gas coal, 500 lire per ton, or \$25.

Foundry coke, 650 lire per ton, or \$32.50.

Steel bars, 1700 lire per ton, or \$85.

Steel plates, basis 4 mm., 2500 lire per ton, or \$125.

Most of the steel mills are refusing orders or they accept them only against the delivery of an equal quantity of coal or scrap and without definite engagement as to deliveries.

### Reduced Output of Sheets and Tin Plates

The production of black sheets and tin plates has decreased very much in Italy owing to the shutting down for several months, because of labor troubles, of the largest plants producing these materials. The imports of sheets and tin plates are quite considerable but could be much larger if the Italian demand could be satisfied in the United States and England.

The government stocks are being reduced rapidly; they are now reduced to little, excepting for scrap steel, of which many thousands of tons are still lying in the battlefields, and cannot be moved for lack of transportation facilities.

In view of the high prices at which steel is sold, the production with electric furnaces is making rapid progress, inasmuch as it is not handicapped by the lack of coal, electricity being produced mostly by hydraulic power. This branch of the industry, however, is somewhat hampered by the persistent drought, but it is hoped this will soon be overcome by the spring rains which are already beginning to fall. The electric furnaces are producing steel castings and steel ingots with attractive profits.

The large plant of Ilva at Bagnoli (Naples) has been forced to blow out its blast furnaces and shut down its rolling mills for an indefinite period, on account of insufficient supply of coal. There is a report that Ilva has acquired under favorable conditions some important industrial concessions in Dalmatia and wants to develop them to the maximum, seeing that labor in Dalmatia is plentiful and is not making impossible demands.

### Fiat Company's Austrian Steel Plant

The Fiat-Turin has bought the larger part of the stock of the Alpine Montan Gesellschaft in Austria, which has very extensive plants for the manufacturing of steel plates, steel bars, etc., backed by blast furnaces, coal mines and ore fields. In view of the favorable rate of exchange with Austria, the Fiat has unquestionably made a very good deal in thus securing supplies of finished steel for its automobile plants. There is no foundation, however, for the rumor that the Fiat company will be able to supply all or a great part of the Italian needs in steel. The Austrian government will probably demand that Austrian needs be provided for before those of Italy. All things considered, the Fiat company will likely be able to import from Austrian plants only the amount of finished steel that is necessary for its plants, perhaps not even so much.

The Fiat company is to-day one of the most powerful and best organized industrial concerns in Europe, and controls several steel mills and construction plants in Italy. Its production of automobiles, motor trucks and agricultural machines is already very high, but could be increased greatly were it not for the scarcity of fuel and steel. This company exports nearly three-fourths of its entire automobile production.

Another important concern, the Acciaierie di Terni in Rome, together with the Banca Italiana di Sconto, has acquired control of the large Cantiere Navale Ungherese Ganz Danubius (Hungarian Naval Shipyard), forming a new company, the Cantieri Navali del Quarnaro, with central office and management in Fiume, and a capital of 26 million lire, of which 80 per cent is Italian and the remaining 20 per cent Hungarian. It is said that Commander d'Annunzio, now in Fiume, has done much to bring this arrangement to a successful termination, thus insuring Italy one of the largest shipyards on the Mediterranean with the co-operation of the young Hungarian Republic.

There is no lack of initiative in the Italian indus-



trial world; the Italians are only lacking coal and the settlement of their political problems.

#### Small Imports from United States

Excepting a few finished steel products (sheets, special plates, etc.) some special machinery, small quantities of pig iron and a very little coal, it can be said that since the date of the armistice up to the present time Italian industries have not yet established a regular current of imports from America. While the demand for any kind of raw and finished products is large, the unfavorable rate of exchange has prevented the conclusion of nearly all business, excepting the little already mentioned. In several instances the Italian buyers were even willing to pay what the American sellers were asking, but it was not possible to obtain from the American industry the desired quantities and qualities.

Optimistic rumors are circulating regarding Germany, where it is said that labor is willing to work even more than the prescribed 8 hr.; in fact, in several

industrial districts they work 10 and 11 hr. a day. At the same time, the utmost is being done to develop those ore and coal fields which were considered unprofitable before the war, but which now have proved lucrative on account of the high prices at which the finished products are sold.

The shipment of coal from Germany to Italy is becoming more and more restricted on account of difficulty of transportation; on the other hand, it has been possible to obtain good quantities of pig iron, steel bars and machinery from the German districts of occupation, from Luxemburg, and also from Moravia and Bohemia.

Switzerland, on account of the very high rate of its exchange, is no longer in a position to export machinery to Italy, as it usually did before the war. Instead the Swiss business men are trying to import from Italy, where they can buy very conveniently on account of the high premium on the Swiss franc. However, very little is being done in steel, because the Italian products which could be exported are very scarce.

## FOREIGN TRADE CONVENTION

### Five General Sessions and Thirteen Group Meetings at San Francisco, May 12-15

SAN FRANCISCO, April 1.—The complete program for the Seventh National Foreign Trade Convention, in this city, May 12 to 15, has been announced by C. P. Converse, secretary of the Pacific Coast committee in charge of the convention. In addition to the general sessions there will be 13 group sessions for informal discussions and the exchange of experiences on export trade methods.

*First General Session.*—Wednesday, May 12, 10 a. m. Address of welcome by Capt. Robert Dollar, dean of the Pacific Coast committee of the National Foreign Trade Council; address on "The Relation of Our Productive Capacity to Foreign Trade," by James A. Farrell, chairman of the National Foreign Trade Council; "The Financial Situation as Applied to Foreign Trade," by F. L. Lipman, vice-president Wells Fargo-Nevada National Bank of San Francisco.

*Second General Session.*—Wednesday, May 12, 2.30 p. m.; general subject, "Imports and Exports." "Function of Imports in Our Foreign Trade," by George E. Roberts, vice-president National City Bank, New York; "The Future of Our Exports," by Frederick J. Koster, chairman Koster Company, San Francisco; "The Railroads and Foreign Trade," by William Sproule, president Southern Pacific Company.

*Third General Session.*—Thursday, May 13, 10 a. m.; general subject, "Foreign Trade Policies." "The Need for a Bargaining Tariff," by Robert H. Patchin, export manager W. R. Grace & Co., New York; "Reorganization of the Foreign Service of Our Government," by W. W. Nichols, assistant to chairman of board of directors, Allis-Chalmers Co., New York; "The Work and Service of American Chambers of Commerce Abroad," by C. W. Whittemore, past president of the American Chamber of Commerce of Buenos Aires, Argentina; "American Organization for Foreign Trade," by Dr. Henry Suzzalo, president of the University of Washington, Seattle, Wash.

*Fourth General Session.*—Friday, May 14, 10 a. m.; general subject, "American Merchant Marine." "American Maritime Policies," by W. H. Kno, Kno & Co., New York; "American Marine Insurance," by Hendon Chubb, New York; "Maritime Securities," by John E. Barber, Harris, Forbes & Co., New York.

In addition to the general sessions there will be group sessions covering all phases of the general convention theme, "The Effect of Being a Creditor Nation," and of all the phases of import and export business dealing with this country's relation to the trade of the world. The following are the subjects that will be taken up at the group sessions:

First Group.—Wednesday, May 12, 8 p. m. "Education for Foreign Trade"; "Financing Foreign Trade"; "The Webb Law in Operation."

Second Group.—Thursday, May 13, 2.30 p. m. "Direct Selling"; "Foreign Credits and Credit Information"; "Sources of Imports."

Third Group.—Thursday, May 13, 8 p. m. "Foreign Trade Promotion Through the Press"; "Banking Services to Foreign Trade"; "American Trade with Russia."

Fourth Group.—Friday, May 14, 2.30 p. m. "Practical Problems of the Export Manager"; "Transportation and Communication"; "Pacific Problems"; "Foreign Trade Advertising."

*Fifth General Session.*—Saturday, May 15, at 10 a. m. The subject is "A National Program for Foreign Trade," with reports of group sessions, the final declaration of the National Foreign Trade Council and miscellaneous business.

### Wishes to Operate Steamship Lines

WASHINGTON, April 6.—The United States Steel Products Co., in a brief filed with the Interstate Commerce Commission, urges that it be permitted to continue the operation of steamship lines through the Panama Canal, as it contends that the fifth section of the act to regulate commerce prohibiting railroad companies and other common carriers from operating, owning or having an interest in common carriers by water operated through the canal which may compete with the rail lines, does not apply to it.

The Steel Products company is a subsidiary of the United States Steel Corporation, and is a trading company engaged in foreign trade, and also in the distribution and sale of steel products on the Pacific Coast of the United States. The Steel Corporation owns a number of railroads, and therefore the commission is asked to pass on the question of whether that fact bars the Steel Products company from operating vessels through the Panama Canal.

"Physical Tests of Motor-Truck Wheels" is the subject of Technologic Paper No. 150 of the Bureau of Standards. In designing the class B military truck it was found desirable to develop a metal wheel having the good qualities of wheels then on the market. No comparative values being available and time for service tests lacking, the Bureau of Standards was called upon to make laboratory tests. From these data a cast-steel wheel known as the composite wheel was designed. Tests showed it to be satisfactory in its final form and it was adopted by the Quartermaster's Department. A copy of the paper can doubtless be had by addressing Dr. S. W. Stratton, director Bureau of Standards, Washington.

## DUPLEXING WITH CUPOLA

### The Electric Furnace as a Super-Heating and Refining Adjunct

The advantages of a duplex process using the electric furnace as an adjunct to the cupola for melting gray iron were outlined by George K. Elliott, metallurgist, Lunkenheimer Co., Cincinnati, Ohio, in a paper, "The Electric Furnace as an Adjunct to the Cupola," presented at the annual convention of the American Foundrymen's Association in Philadelphia last fall. The author called attention to the fact that while the cupola is an efficient furnace for melting iron, it has certain limitations which prevent it from furnishing an iron which meets entirely the requirements for certain classes of castings. But for the ordinary run of iron castings, comprising possibly 90 per cent of the total output of the country, there was said to be no valid economical reason for either displacing or radically modifying the modern cupola.

The author states that whatever its faults may be, it must be acknowledged that for preheating iron up to the melting point and, after that, performing the fusion itself with a minimum waste of heat, the cupola stands supreme among foundry furnaces. Its melting efficiency is about 40 per cent, although in the hands of the unskilled it may fall as low as 25 per cent, while the adept may drive it along at a rate of 50 per cent efficiency. But although the cupola is practically without a rival as a preheater and melter, it does not attain the same high rank as a superheater of molten metal. The cupola operator's problem in obtaining superheated iron is largely one of circumventing gravitation as it is manifested in the speedy dripping of the molten iron through and away from the hottest zone of the cupola.

In the duplex process all responsibility for superheating is taken from the cupola and assigned to the electric furnace, where it can be superheated with the greatest ease to a degree that is not possible in any other kind of furnace. Superheating in the electric furnace enables the foundrymen to make castings of low-phosphorus iron which otherwise it would be necessary to make of high-phosphorus iron, because he can safely shift the responsibility for fluidity from the material

to the furnace. Another advantage and by no means a minor one is that hot iron tends to increase solidity in castings; that is, not only closeness of grain, but also freedom from blow-holes, shrink-holes, slag inclusions or like defects.

In dealing with the electric furnace in relation to refining it is preferable to consider separately the acid-lined and the basic-lined furnaces. The acid-lined furnace refines entirely through maintaining a constant reducing atmosphere in contact with the metal. One must, however, turn to the basic-bottom electric furnace to find potentiality in refining at its greatest. Almost any metallurgical reaction may be conducted in it, including oxidation, reduction, dephosphorization, desulphurization, decarburization, carburization, mixing with ferroalloys, superheating and others. The duplex process for cast iron is chiefly concerned with reduction, desulphurization and mixing.

Standard pig iron containing a maximum of 0.05 per cent sulphur contains from 0.07 to 0.11 per cent after coming from the cupola, the degree of contamination depending upon the sulphur content of the coke, the condition of the cupola and its accessories and the skill and knowledge of the cupola's attendant. The same iron from the cupola may subsequently have its sulphur reduced to about one-third or one-fourth by 30 or 40 min. refining on a basic bottom electric furnace. The average of a great number of duplexed heats of gray iron was 0.088 per cent sulphur in the melt from the cupola, while in the final product from the electric furnace the average was 0.036 per cent. As low as 0.009 per cent sulphur in occasional heats has been produced in gray iron with little difficulty under everyday working conditions.

The electric furnace phase of the duplex process is particularly good for mixing. It enables a perfect mixing of the original raw materials, assuring homogeneity in the single heat, and it facilitates the accurate duplication of results, assuring uniformity among several heats. It also simplifies and insures the perfect admixing of alloys such as ferrosilicon and ferromanganese. The electric furnace allows steel scrap to be mixed with the iron and by this means the amount of total carbon in the metal can be controlled, while when steel scrap is mixed with iron in the cupola an indefinite amount of carbon is taken up from the coke.

## RAIL FAILURES DUE TO SEAMS

### Pickling Test Would Prevent the Laying of Such Rails in Track

The last report of James E. Howard, engineer-physicist of the Interstate Commerce Commission, on an investigation of a failed rail, deals with a 90-lb. Bessemer rail in which a base fracture caused the derailment of a train on the Chicago & North Western Railway near Lebanon, Wis. The origin of the fracture was at a longitudinal seam on the under surface of the base about midway of its width. The report discusses both interior and exterior seaminess and a number of illustrations are given with it showing how seams or streaks produce half-moon fractures. Reference is made to the large number of recent base fractures. In connection with the investigation of the rail which failed at Lebanon 748 rails were inspected which failed in the same manner. Among the number were 224 in one group, companion rails of the one that failed. Surface seaminess on the base was common to all. These failed rails represented the product of six mills and had been in service on different divisions of seven railroads. Their weights ranged from 75 lb. per yard to 107 lb. The periods of time in the track were from four months to 13 years. The progressive character of the fractures was as apparent on those which failed in four months' time as on those of the longest duration in the track.

Surface seaminess, it is pointed out, has been variously ascribed to the original surface condition of the ingot, to the effects of breaking down passes of the

blooming mill, to ragging of the rolls and to an intermediate pass of the rail mill.

Various half-tone views are given showing how the pickling bath had revealed evidence of seaminess which had been obscured by the formation of mill scale. The usual inspection, the author states, does not adequately provide for the detection of seams, the result being that rails are often put in track which promptly fail from seaminess of the surface. The pickling and examination of rail crop ends are suggested as an additional safeguard that might well be employed. As nearly all base fractures have been found to exhibit an initial seam at the under surface, along the middle of the base, the elimination of this initial seam should result in prolonging the life of the rail. Limitation of wheel pressures, along with the elimination of seaminess in the steel, interior and exterior, is also commented on as a chief factor in the steel rail problem, the author holding that "even the super-rail will have its limitations in strength and durability measured by the intensity of the wheel pressures it will sustain. . . Notwithstanding the great disparity in size between a locomotive and the rail which supports it, and the seeming inadequacy of the foundation on which the rail rests, very few rails fail by direct bending stresses. Failures, directly or indirectly, are chiefly connected with intensity of wheel pressures."

The Arnold Razor Co., Reading, Pa., has purchased the plant of the J. B. Koller Spoke & Bending Co., Mechanicsburg, and is remodeling the plant to suit its needs. More than 150 men will be employed in the new plant.

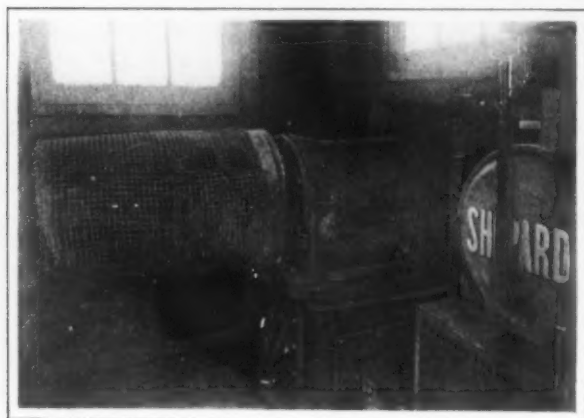
### Electric Car Hauling Winch

A new type of electric car hauling winch recently developed by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., is shown in the accompanying illustration. The operating units of this machine are identical with the units of the Shepard electric hoist and embody the same features as follows: All moving parts are fully inclosed, making the entire machine weatherproof with the exception of the motor; the gearing is of the so-called balanced drive type, driving at two points diametrically opposite, thus making for long life, efficiency, quietness and safety.

The winch is mounted on a cast base which incloses



This 4 1/2-Ton Car Hauling Winch Is Operated By a 22-Hp. Electric Motor at a Speed of 55 Ft. Per Min. The upper and lower illustrations show the winch installed in a winch house with the drum extending through the side of building



the controller resistance. A standard Shepard controller is used and may be mounted directly on the base or separate for remote control. The machine can be furnished with a gear shift, giving a reduction of 4 to 1. This enables the winch to handle four times the rated load at one-quarter the rated speed.

The illustrations show one of these winches installed in the new coaling station of the New York Central Railroad at Rennselaer to be used in place of locomotives to draw loaded coal cars up to the dump. This winch has a capacity of 4 1/2 tons, a speed of 55 ft. per min. and a winding drum capacity of 250 ft. of cable. It is driven by a 22-hp. 3-phase 25-cycle General Electric motor running at 700 r.p.m.

The machine is installed in a winch house with the drum extending through the side of the building. The usual method of operation is to attach the wire cable to the ring in the side of the car.

Exports of iron ore from Algeria in 1919 were 782,805 tons, as compared with 759,217 tons and 1,065,512 tons in 1918 and 1917 respectively, according to *L'Echo des Mines*.

### Brass Manufacturers' Meeting

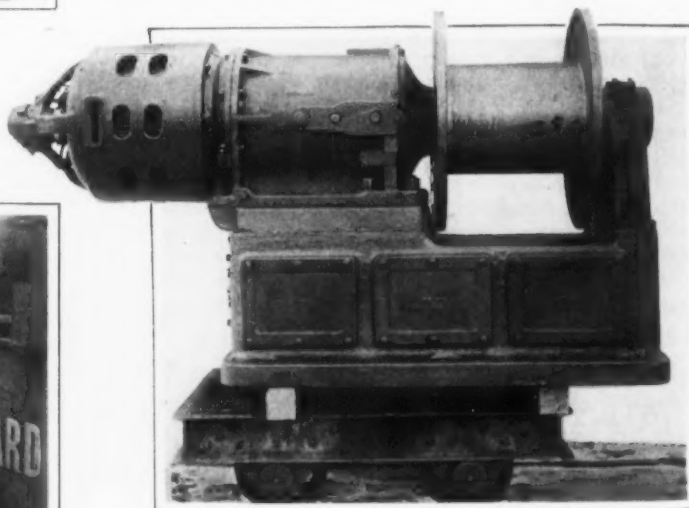
The spring meeting of the National Association of Brass Manufacturers was held at the Hotel LaSalle, Chicago, March 18 and 19. The report of William M. Webster, commissioner, indicated that the association was in a healthy condition financially and numerically. Hose thread dimensions were adopted, these having been concurred in by the National Screw Thread Commission, Washington. It was decided to incorporate all standards that have been adopted by the association in co-operation with the National Screw Thread Bureau of Standards at Washington, to appear in the official catalog. The association passed and indorsed a military training resolution.

Considerable interest was taken in discussing the question of whether the word "hot" and "cold" on plumbing fixtures were of real value or served any useful purpose. This matter was laid over for discussion at the June meeting, which will be held in Cleveland.

The association reaffirmed its position of refusing to stamp names of customers on goods.

### Will Not Accept Gifts

The Purchasing Agents' Association of Western Massachusetts, at its initial birthday party in Hotel Kimball, Springfield, last week, voted to hereafter accept no gifts from concerns or salesmen representatives. The following officers were elected for the new year: W. H. Cutler, Knox Motors Co., president; F. L. Wood, United States Envelope Co., vice-president; John Pauly, American Bosch Magneto Co., secretary; E. B. Plum-



mer, Fisk Rubber Co., treasurer; and M. J. Bray, M. L. Cramer and D. L. Harris, executive committee.

The Harvard Engineering School, Cambridge, Mass., has a new plan of instruction for the junior year whereby students, who wish, may spend half their time as employees in factories within easy reach of the school. The plan has the backing of the Associate Industries of Massachusetts.

### Carborundum Company Makes Extensions

When its building plans are completed, the Carborundum Co., Niagara Falls, N. Y., will have spent about \$500,000 in extensions and improvements. A three-story addition, 81 x 432 ft., has just been built to the paper and cloth plant at Niagara Falls for the storing and curing of all carborundum, garnet and aloxite paper and cloth products, and for the extension of the rubber bonded wheel department. One of the wheel making and kiln departments has been extended by a new two-story building, 64 x 96 feet, both of these new structures being of concrete. Work will start at once on additions to the crushing departments and improvements at the furnace plant at Niagara Falls, Ont., where the abrasive aloxite is made, and at Shawinigan Falls, Quebec, at a carborundum furnace plant. Besides these operations, extensions will be made to fourteen departments at Niagara Falls.



# Electric Practice in Making Ferroalloys

## American Electric Ferromanganese Compared with the Blast Furnace Product—Losses and Power Consumption—Commercial Conditions

BY W. A. DARRAH\*

**T**HIS article outlines present methods of manufacture of ferroalloys and is intended as a summary of practice during the past year. In collecting these data many plants were visited in all parts of the United States, and the writer enjoyed discussion with representatives of the various Government bureaus, furnace manufacturers, etc. These data are supplemented from his own operating experience as general superintendent of the Noble Electric Steel Co., Heroult, Cal.

### Ferromanganese

Since the reduction of manganese ore to ferromanganese is purely a matter of maintaining the proper temperature with the presence of carbon as a reducing agent and lime to form a slag with the silica, it will be evident that any economical source of heat which allows proper mechanical handling may be employed.

#### From the Blast Furnace

The blast furnace when properly manipulated easily reaches a temperature of 3200 deg. Fahr., which is most satisfactory for the reduction of manganese oxide and silicates. The blast furnace is operated very similarly to pig iron practice, except that very much more coke and lime are used. A typical charge is two tons of 45 per cent ore, 3 tons of coke and 1.50 tons of lime, or the equivalent. With a charge of this nature maintained at approximately 3200 deg. for 36 hr., 80 per cent ferromanganese can readily be produced with a loss of not more than 20 per cent of the manganese content of the ore. This loss is divided roughly into 12 per cent volatilization loss and 8 per cent slag loss. The cost of producing one ton of 80 per cent ferromanganese from Brazilian ore with modern equipment in the Chicago district with material prices, at war time basis, is approximately \$130. This brief summary is necessary in order to present the proper perspective of the commercial side of the manufacture of ferromanganese in the electric furnace.

The most satisfactory ore is a Brazilian ore, which until the war has been fairly easy to obtain, since Brazil has no coal and it is almost imperative that we supply her with coal; the manganese ore, therefore, is a matter of balance of trade being returned in the empty coal steamers. Considerable difficulty has been experienced regarding the supply of Brazilian ore in the immediate future, owing to the scarcity of ships. To some extent Virginian ores have been used, but these so far have only been found in pocket deposits and are relatively small, inaccessible and variable in composition. As a result they are avoided as far as possible. It is stated that the United States Steel Corporation and the Jones & Laughlin Co. have both secured a fairly good grade of ore from Montana, but the length of time that this would be available is uncertain.

The fuel which is most satisfactory for Eastern purposes appears to be a good grade of anthracite coal, although coke is used to some extent, and during the fuel-less days, last December, electrode stubs were crushed and used at one plant. While it is possible to operate with the crushed stubs, some little difficulty was experienced, due to excessive smoking, rather violent explosions in the furnace, and occasional short circuits. If the stubs are mixed with a quantity of coal or coke, better results could be secured, although they do not as readily reduce the ore as other forms of carbon.

Limestone is invariably employed as a flux to com-

bine with silica. Good practice consists in the addition of approximately one ton of lime to each ton of silica contained in the ore charged. Fluorspar is frequently added to make the bath more liquid, as this allows the use of an excess of lime, with a resulting diminished loss of manganese in the slag. No other fluxes are being used commercially, although from a study of the situation it is possible that the addition of small quantities of other materials may be of decided advantage. This point is well worth further experimental investigation.

#### From the Electric Furnace

The open trough type of non-tilting furnace is now used exclusively in the manufacture of both ferromanganese and ferrosilicon. Recent samples of good mechanical construction, show a rectangular steel tank, formed from  $\frac{3}{8}$ -in. to  $\frac{1}{2}$ -in. boiler plate, riveted together, reinforced around the top and bottom with steel channels. One tap hole is usually provided, but in some cases three or four are used. The furnace is supported on a concrete base, on which are placed steel rails, so arranged that there is free air circulation on all sides of the furnace and under the bottom.

The furnaces are usually lined first with fire brick and then faced with silica brick, the total depth of the lining varying from 18 in. to 24 in. Ferromanganese furnaces are usually provided with a tamped carbon bottom and sides to a height slightly above the slag line. At one plant carbon blocks are used to line the bottom, but the more common practice appears to be a tamped bottom made from tar and crushed coke. Water-cooled furnace shells seem to be in general use. One large plant has experimented with water sprays with satisfactory results. The life of the furnace shell appears to be almost indefinite, and with careful operation the life of the lining may easily reach 18 months to two years.

The best practice is to construct a platform or floor surrounding the furnace on a level with the top edge. This platform serves as the charging floor, and the material for the charge is delivered by conveyors to this floor, mixed ready for charging. The floor may be either of steel or concrete.

Three-phase, three (or four) electrode furnaces are exclusively used. The voltage between electrodes ranges from 50 to 80 volts. Both 60-cycle and 25-cycle currents are used. The furnaces are occasionally provided with a hood and exhaust fan for carrying away the fumes, but this is not universal practice, and where the furnaces are installed in a large building, with sufficient head room and proper roof ventilation, the hood is not necessary, as far as the comfort of the workmen is concerned.

As an example of average practice in the dimensions of furnaces, it is interesting to note that a 25-cycle, 1500-kva., 3-phase furnace working on ferromanganese has an interior opening approximately 5 ft. wide, 5 ft. deep and 12 ft. long. The lining of the furnace is approximately 18 in. thick.

#### Electrodes

Amorphous carbon electrodes are used almost exclusively in ferroalloy manufacture in the East. On the Pacific Coast graphite electrodes are extensively used. There are a number of reasons for this practice, but essentially it is a matter of cost and delivery. The carbon electrodes are, of course, much cheaper, and there are more sources of supply available than for the graphite electrodes. The area of the section of electrodes varies somewhat, but averages about 1 in. for each 50 ampere of current capacity. Both round

\*Vice-president Continental Industrial Engineers, Chicago.

and square electrodes are in common use, although the tendency is to use square electrodes both because of the ease of making electrical connections and the greater facility in building up multiple electrodes. The carbon companies are able to supply both shapes equally readily.

As a rule the electrodes are not protected against oxidation, although at several plants they are commercially using electrodes which were wrapped with wire netting, on which is plastered a refractory cement. This process results in a longer life for the electrodes, but so far has caused considerable difficulty, due to the cement cracking and falling off. It is doubtful if the results warrant the expense involved.

In the case of one installation operating a furnace with a capacity of approximately 1300 kva., 18-in. square electrodes seemed to be giving excellent service. Another furnace (operating on ferrosilicon) with a rated capacity of 13,500 kva., is using three electrodes on each phase, each electrode being 20 in. square. Another furnace using about 3000 kva. is equipped with round electrodes 24 in. in diameter.

There are in use a very great variety of types and designs of electrode holders, although the general practice seemed to be gradually adopting one particular type which was giving satisfactory service. This is a holder adapted for square carbons and consists essentially of two flat steel blocks, cored out to provide for water cooling, and arranged on opposite sides of the square electrodes. Copper straps,  $\frac{1}{2}$  in. in thickness, are placed between each block and the carbon electrodes, and the whole are bolted together by hollow water-cooled steel bolts. In order to improve the electrical contact, it is a common practice to place a sheet of copper gauze between the copper straps and the electrode. The copper straps are brought together above the electrode and bolted to a heavy steel hook. Copper plates are clamped on each side of the copper strap and serve to complete the contact from the flexible cable, which connects the transformers with the electrode.

The electrodes are invariably supported at their upper end by a cable or chain, so that the holder and electrode move together as a unit, both during the ordinary regulation of the furnace and also as the electrode is consumed. This, of course, requires a minimum expenditure of time in attaching the holder and allows a comparatively rapid replacement of the electrode when consumed. The time of renewal of an electrode varies at different plants. The shortest time which I have seen is about five minutes, while some plants require nearly 30 minutes to change an electrode.

All electrode holders were water-cooled, and the cables leading to the electrodes were protected from the fumes and heat of the furnace by flexible screens, supported from the electrode holders. In some well-designed plants hollow copper pipes, through which cooling water circulates, are used to connect the electrode holders with the flexible leads, thus keeping the flexible leads away from the radiant heat of the furnace.

It is a common practice to keep a stock of three or four electrodes fastened in the holders and ready for instant use whenever required. At several plants the stubs of the used electrodes are joined by a threaded connection to the lower end of the new electrode, although all of this work is done on the cold electrode and no attempt is made to join electrodes while the furnace is in operation. The life of an 18-in. sq. electrode in a 1300-kva. furnace ranges from 24 hr. (in one case where the electrode was exposed to unusually severe air currents) to three or four days in normal operation. Aside from accidents the life of an electrode holder appears to be indefinite.

The contact between the source of current and the electrode is usually made with metallic copper or bronze, while the parts of the holder which are required for mechanical strength in supporting the electrode and in clamping the contact pieces are usually made of cast steel, or in some cases, cast iron. This practice, of course, materially reduces the expense of the holder. In the case of furnaces operating on 25-cycle circuits, the heating of the iron parts, due to the inductive effect

of the current, is negligible. On 60-cycle circuits the heating of iron or steel parts in an electrode holder is much greater, but not prohibitive. The heating can be practically eliminated by the use of manganese steel, which is, of course, practically non-magnetic, and has been employed for this purpose.

Regulation is usually obtained by removing the electrodes in or out of the furnace, rather than by variation of voltage; while I know of no commercial plant which uses a variable voltage regulation for producing ferromanganese in the East, there are several large installations of this type in the West. Both automatic and manual regulation are employed. Automatic regulation, where employed, is giving satisfactory results without appreciable operating troubles. It is universally believed by the operating men that automatic regulation is unnecessary since the changes of resistance, voltage, etc., take place so slowly in the average furnace that manual operation is satisfactory. However, because of the labor unrest many plants are installing automatic control throughout.

The usual arrangement consists of a small motor driving a windlass through a worm gear. For operating a 20-in. electrode a 2-hp. direct-current motor is usually employed, while for the same work a 5-hp. alternating current motor is required. The alternating current motor must be of greater capacity than the direct current motor, because of the lower starting torque.

It is common practice to support the electrode from a pivoted boom, mounted on roller bearings and so arranged as to swing over the furnace and also to be moved away from the furnace and over the charging platform. The boom can be rotated as well for removing them from the furnace when necessary.

In controlling the power consumption of the furnace, the operator watches only the ammeter, raising the electrode when the current is too high and allowing the electrode to fall when the current is too low. One difficulty which is sometimes experienced in this method of regulation is the tendency of the electrode to rise entirely out of the furnace, due to the material increase in resistance of the charge around the electrode. This is readily counteracted by the addition of new material around the electrode, thus, if the resistance around the electrode becomes too great, the addition of coke will improve the conductivity and allow the electrode to fall, while if the resistance around the electrode becomes too small the addition of lime will raise it and allow the operator to raise the electrode, without decreasing the current.

#### Operating Practice

A new furnace is usually started by filling it with coke, applying the current until the coke is a bright yellow and then gradually adding the charge of ore, limestone and carbon. A period of two to four days is often required for starting a cold furnace. The charge is usually distributed on the furnace by hand, two men with shovels being able to easily handle a 3000-kva. furnace. The charge is delivered on the furnace floor by a conveyor and is mixed in the proper proportions, designated by the laboratory when delivered. The ore, limestone and carbon are usually crushed so that the largest piece will pass through a 2-in. ring. It would appear that perhaps 50 per cent of the charge would pass through a  $\frac{1}{2}$ -in. ring. There is a considerable amount of dust in the charge, which does not appear to give trouble, owing to the presence of the larger particles. Great difficulty, however, results in operating a furnace in which the entire charge is composed of fine particles.

As might be expected, the various operators know very little about the temperature within their furnaces. It appears that the best operating temperature is in the neighborhood of 1500 deg. C. When this temperature is maintained uniformly throughout the furnaces the loss due to vaporization can be commercially held under 4 per cent. At one plant their volatilization loss was under 3 per cent. In others it reaches 10 per cent. It is, of course, well known that the range of temperature between the melting point and boiling point of metallic manganese is small and for



that reason it is necessary to work with a temperature as low as possible and yet secure a satisfactory percentage loss of manganese in a slag. Since metallic manganese will boil at 1900 deg. C. and has an appreciable vapor pressure at 1500 deg., it is necessary to have some means to condense the volatilized material. In ordinary commercial furnaces the cool charge above the fused bath serves to condense a portion of the manganese vapors and return them to the bath as the charge fuses down. This is one of the reasons for the depth of present furnaces (5 or 6 ft.). The heat saving due to the insulating effect of the cold charge is another important cause for the relatively deep ovens.

The liquid charge is maintained 8 to 10 in. deep and tapped off at regular periods, varying from 1½ to 3 hr. under normal operating conditions. The slag obtained may contain an average of from 15 to 20 per cent manganese and is stored until a sufficient quantity has accumulated, when a furnace is operated using this for its charge, slag and carbon. This yields a product, silico-manganese, which averages 25 per cent manganese, 50 per cent silicon and the balance iron, carbon, etc. Other grades of silico-manganese are produced and marketed, but the above is typical.

The laboratory keeps a constant watch on the analysis of the ore, adding the proper quantity of lime to form the monosilicate. The quantity of carbon added is that theoretically necessary to reduce the manganese, iron and 10 per cent excess for silica reduction and losses. An excess of carbon is objectionable, not only because of the expense, but also because of the tendency to form calcium carbides, and the excess of silicon in the alloy and a poorly operating furnace.

#### Power Consumption

The power consumption for ferromanganese seems to average about 7000 kw.-hr. per ton of alloy. Contrary to what might be supposed, accurate records are not available on this point, covering extended operations.

#### Sources of Losses

There are four main sources of losses of manganese in the electric furnace, as follows:

**Mechanical:** Losses of manganese in metallic form occasionally reach 10 per cent when the furnace is not tapped at the proper temperature. This results from the freezing of the slag before all of the globules of metal have had an opportunity to settle out. The presence of an excessive amount of lime or of unusual amounts of alumina may also cause this trouble by making a slag which is too refractory. This loss is overcome at one plant by a crushing and mechanical separation of the slag. The use of flourspar, by making the slag more liquid, materially reduces this loss.

**Volatilization:** Losses of manganese due to volatilization usually do not exceed 3 or 4 per cent, unless the temperatures in the furnace at certain localized points are excessive. The loss from volatilization may be reduced by increasing the depth of the cool charge, but as a rule this is not maintained more than 5 or 6 ft. The more satisfactory method of reducing volatilization loss is to so arrange the electrodes and so adjust the current that the temperature conditions within the furnace are as uniform as possible. Local arcing, due to poor feeding of the furnace, too much powdered charge, arching of charge, etc., materially increases volatilization. A careful stoker by intelligent attention to his furnace will materially reduce this loss.

**Slag Loss:** The content of manganese chemically combined with silica and other materials in the slag varies from 8 to 25 per cent. Good Eastern practice usually produces slags containing around 15 per cent of manganese and it is possible to rework these slags so that the final loss from this cause does not exceed 6 per cent in commercial practice. A hot furnace, well stoked, and a charge having a slight excess of carbon and lime give minimum losses in the slag. This is the usual practice on the Pacific Coast.

**Oxidation:** There is a small loss of manganese by oxidation, in case a furnace is operated with a charge which is not thoroughly mixed and also in case the furnace is tapped at too high a temperature. The losses from these sources are usually negligible, however.

In order to give a brief perspective of the Eastern practice, it is of interest to consider the labor required. A 1300-kva. furnace requires the following force of direct labor, exclusive of plant superintendents, engineers, etc.

One furnace superintendent, one regulator man, one man

for charging, one furnace laborer, one tapping foreman, two tapping laborers, one electrician and three laborers handling slag and metal.

In addition to the above, a well-organized plant, operating a total of five such furnaces (three of which are in continuous service), requires a laboratory which will employ three to four chemists. The output of a plant of this size averages in practice about 1000 tons per month, allowing for the inevitable occasional shut-downs.

(A supplementary article on ferrosilicon by the same author will appear in an early issue.)

#### Wastage of Beehive Ovens

WASHINGTON, April 6.—Additional testimony has been taken by the ordnance subcommittee of the House War Investigating Committee on the settlement of contracts of the War Department for the construction of by-product coke ovens. G. B. Frankforter, who was connected with the claims bureau of the War Department during the settlements of the contracts with a number of steel cases, told the committee that he believed it could do an inestimable amount of good in spreading propaganda to stimulate the use of by-product ovens and stop the use of beehive ovens.

"Assuming that in normal times we should increase our production on the average basis, when we get back to the normal we shall consume annually about 600,000,000 tons of bituminous coal," said Mr. Frankforter. "About 100,000,000 tons of that coal would not be coking coal. At the present time, practically 100,000,000 tons of that coal is converted into coke, leaving 400,000,000 tons of coal burned, the by-product, most of which is wasted. And taking the basis—and the average prices to-day—for instance, in that amount, 400,000,000 tons of average bituminous coal will yield 2,224,000,000 units of gas, a unit being 1000 cu. ft. At 10c per 1000, that would amount to \$224,000,000 wasted. The tar—and in tar I include toluene and benzine—that amount of coal would yield 3,600,000,000 gallons of tar, and I put the price down at 4 cents a gallon, which is a minimum, which will amount to \$144,000,000. Ammonium—and I have estimated that amount of coal would yield, 1,250,000 tons of ammonia gas and I put the price which was fixed for salvage, namely, \$60 a ton, which would amount to \$75,000,000, a total of \$443,000,000 a year, which could be recovered if all the coal should be coked and used properly."

#### Buying Bars in Germany

WASHINGTON, April 6.—Extracts from the Cologne *Gazette* received by the Department of Commerce state that numerous orders for iron bars are being placed in Germany by many countries. Orders from Belgium, France, Italy, and Holland are especially numerous, and price seems to be a minor consideration. The *Gazette* sees in this dependence on the German iron industry a means of improving mark exchange, and gives a list of prevailing export prices which are much higher than those fixed for domestic delivery.

The Ordnance Salvage Board of the War Department has offered for sale by informal bids the site, buildings and plant equipment of the Park plant of the Bartlett-Hayward Co. at Baltimore. Bids will be received until April 15. The plant was erected and designed for the manufacture and assembling of 155-mm. shrapnel projectiles, and is particularly adapted for the manufacture and assembling of automobiles or motor trucks. Included in the structures are five machine shops, tool shops and other buildings.

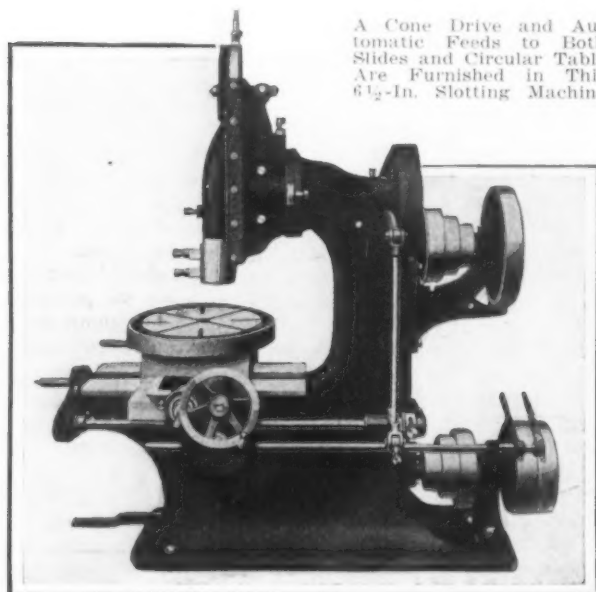
Absorption as applied to the recovery of gasoline left in residual gas from compression plants is discussed in technical paper 232, issued by the Department of the Interior, Bureau of Mines. In the absorption process the gasoline present in the natural gas is absorbed by oil and subsequently separated from the oil by distillation, or is absorbed in naphtha and marketed without any further treatment.



### Atkins 6½-In. Slotting Machine

The 6½-in. slotting machine shown in the accompanying illustration is manufactured by Harry F. Atkins, Old-Fletton, Peterborough, England, and is being introduced to American manufacturers by Alfred Herbert, Ltd., 54 Dey Street, New York. The machine is cone-driven and is equipped with automatic feeds to both slides and circular table. The table has an effective diameter of 16 in., is graduated in degrees, and has a locking device with 12 divisions. Work can be admitted having a depth of 7½ in., and a diameter of 30 in.

The ram has a stroke up to 6 in. and can be swivelled to obtain taper keyways or other taper work. The



A Cone Drive and Automatic Feeds to Both Slides and Circular Table Are Furnished in This 6½-In. Slotting Machine

tool holder which is of the clapper type is universal in movement. The speeds range from 26 to 77 strokes per min., and feeds range from 0.004 to 0.024. The longitudinal traverse is 12 in., and transverse travel 12 in.

It is pointed out that all gears are mounted dust-proof and oil-tight. A Treadle break is provided and the counter-shaft is self-contained. Other specifications are as follows: Outside suds tray, effective diameter 20 in.; 3-step cone pulley, diameters 10, 8 and 6 in.; counter-shaft pulleys, diameter 12 in.; counter-shaft speed 270 r.p.m.

### Preparing to Store Large Tonnages of Coal

YOUNGSTOWN, OHIO, April 5.—Creation of a five-acre storage yard for coal at its Haselton blast furnace plant, Youngstown, Ohio, is announced by the Republic Iron & Steel Co., an improvement likely to be followed by other iron and steel producers. The Republic yard will hold about a month's supply and is designed to offset the spasmodic fuel shortages which have seriously crippled operations the past three months. Later this storage capacity is to be substantially enlarged. The yard will be equipped with a Gantry crane, and its operation will be similar to that of an ore bridge, and coal will be stocked in the same manner that ore piles are built up.

While all steel makers in the district have heretofore stored coal in large tonnages during the summer for winter consumption, the Republic company improvement is regarded as the most advanced step yet taken in providing against periods of shortage. Up to this time, Mahoning Valley companies have not looked favorably on the storage of coal in great quantities, not only because of the expense involved, but on account of the danger of spontaneous combustion in the stored fuel and the deterioration to coal stored in the open. Heating value deteriorates through slacking and evaporation as high as 10 and 15 per cent, states an authority, and is more marked in high volatile coals.

While other companies were suffering during the

past winter because of inadequate fuel supplies, the Carnegie Steel Co. was enabled to maintain operations close to normal by drawing on stock piles. Later, though, when these supplies were exhausted the Carnegie company suffered with other producers, but its schedules were more uniformly maintained than those of any other district plant. It is understood the United States Steel Corporation is planning creation of a large coal storage yard in vicinity of Clairton, Pa., whose supplies can be drawn upon in times of need for the various plants.

Provision will also be made in the new Republic yard for the handling of limestone and coke.

Estimates place the amount of coal consumed by industries in Youngstown at 9,000,000 tons annually, with the Republic Iron & Steel Co.'s needs placed at 2,000,000 tons. When the 25 blast furnaces in the Mahoning Valley are operating normally, about 6,000 tons of limestone are used daily. In addition large tonnages of by-product and beehive coke are utilized.

### British Steel Exports in February Show Gains

British steel exports in February this year, excluding iron ore and including scrap, were 231,065 gross tons, which compare with 261,248 tons in January. These exceed the outgo for any month in 1919. The February exports in 1919 were 110,441 tons. The present rate, however, is far below that of 1913.

Iron and steel imports in February this year were 71,977 as against 79,024 tons in January, which is considerably above the amount for 1919. This was exceeded only three times in 1919, when the imports were 87,892 tons in October, 76,163 tons in September and 73,516 tons in November. In February, 1919, the imports were 46,414 tons.

The following summary gives the relative exports and imports for January and February, 1919 and 1920, and the average per month for 1913 and 1919 in gross tons:

	Exports 1919	Imports 1920
January, 1919 .....	171,111	52,588
February, 1919 .....	110,441	46,414
January, 1920 .....	261,248	79,024
February, 1920 .....	231,065	71,977
Average per month, 1913 .....	420,757	195,264
Average per month, 1919 .....	204,516	51,557

The trend of some of the principal exports is shown by the following data in gross tons:

	Av. Per month, 1913	Av. Per month, 1919	Feb- ruary, 1919	Feb- ruary, 1920
Pig iron .....	78,771	21,503	16,112	60,990
Steel rails .....	41,676	10,435	762	5,085
Steel plates .....	11,162	19,962	14,825	16,476
Steel bars .....	20,921	20,787	14,942	18,055
Galvanized sheets .....	63,506	15,508	2,126	24,757
Tin plates .....	41,208	24,147	13,640	21,751
Black sheets .....	5,679	11,109	5,880	8,535

The principal export gains in February, 1920, over February, 1919, and the 1919 monthly average have been in pig iron and galvanized sheets.

Pig-iron imports last February were 15,500 tons against 27,601 tons in February, 1919. The average per month in 1919 was 13,623 tons and in 1913 they were 18,059 tons per month.

Manganese ore imports in February, 1920, were 25,252 tons. These compare with 24,031 tons in February, 1919, and with 63,685 tons in January, 1913. The total for the first two months of this year has been 50,185 tons against 57,247 tons to March 1, 1919. The average per month in 1913 was 50,098 tons and in 1919 it was 22,150 tons.

### New Installation of a Moore Electric Furnace

The Emery Steel Castings Co., a recently organized company, has ordered a 1½-ton Moore electric furnace from the Pittsburgh Furnace Corporation, Milwaukee, Wis. The new company is located at Baltimore, Md., and expects to deliver electric steel castings about July 1.

# Lorraine Steel Works in French Hands

Extent of the Industry in Annexed Territory  
—Difficulties with Labor Under New Ownership — Only One-Third Normal Output

TRADE Commissioner J. F. Butler has sent from Paris to the Bureau of Foreign and Domestic Commerce at Washington a report on the iron and steel industry in Lorraine under French control that contains a much larger proportion of valuable and dependable data than the average report from one of our commercial representatives abroad. Some of Mr. Butler's statements have been anticipated by what has been published in fragmentary form, in the past 18 months relative to the Lorraine district and its iron and steel works. In *THE IRON AGE* of Nov. 13, 1919, also in the issue of Nov. 20, liberal extracts were made from a report of a British commission on the steel works of Lorraine and the Saar. But Mr. Butler has brought the conditions in the annexed territory down to February, and for that reason what he has written is worth reproducing. Also, he has given details not available elsewhere of the difficulties as to labor, fuel and other factors which the new French owners have met. As a matter of record the report is therefore quoted from at some length below:

## Forty Years of Expansion

The first blast furnaces in Lorraine were constructed about the end of the seventeenth century. In 1870, when Lorraine was annexed by Germany, the region counted 38 small blast furnaces producing 200,000 tons of iron a year. To-day there are 59 iron mines and 68 blast furnaces, many of which are of the most modern type, capable of producing 3,800,000 tons of pig iron a year. Since 1880 development in the Lorraine mining and metallurgical region has been enormous, that year marking the entrance of German capital into those industries on a large scale. Blast furnaces and steel plants sprang up in numerous localities, and this process of development continued rapidly up to and during the war. The result is that after the armistice France found itself in possession of a region of the greatest industrial richness, the importance of which is intensified when the lamentable condition of the mines and the heavy metallurgical establishments in northern and eastern France are considered.

## The Lorraine Blast Furnaces and Steel Plants

The metallurgical establishments of Lorraine include complete groups—that is, plants consisting of blast furnaces, steel works, rolling mills, etc.—and establishments consisting only of blast furnaces. The latter have their steel works and rolling mills in the coal-mining region of the Saar, and were constructed at a period when it was economical to have the blast furnaces located near the coal supply. Modern methods of manufacture have destroyed this advantage, and the Saar blast furnaces now find themselves severely handicapped, as compared with their Lorraine competitors situated in the iron ore basin.

The steel plants of Lorraine comprise 68 blast furnaces, 27 converters, and 10 Martin furnaces, distributed among the following companies:

Aciéries de Wendel, at Hayange: 9 blast furnaces of 100 to 200 tons' capacity; 6 Thomas converters of 13 tons; 4 Martin furnaces of 30 to 45 tons; rolling mills. The production in 1913 was 519,393 tons of iron and 395,939 tons of steel.

Aciéries de Wendel, Moyeuvre: 8 blast furnaces of 120 to 190 tons; 4 Thomas converters of 12 tons; rolling mills. They produced 328,148 tons of iron and 261,837 tons of steel in 1913.

Aciéries Thyssen, at Hagondange: 6 blast furnaces of 300 tons; 5 Thomas converters of 30 tons; 2 Martin furnaces of 80 and 60 tons; 3 electric furnaces, 1 of 20 tons and 2 of 8 tons; rolling mills. The production in 1913 was 490,383 tons of iron and 435,000 tons of steel.

Aciéries de Rombas, at Rombas: 8 blast furnaces of 200 tons at Rombas, and 4 of 180 to 200 tons at Maizières; 6 Thomas converters of 22 tons; 4 Martin furnaces of 20 tons; rolling mills. Production in 1913 was 769,000 tons of iron and 590,000 tons of steel.

Aciéries de Knutange, at Knutange: 10 blast furnaces of 200 tons; 6 converters of 30 tons; rolling mill. Production in 1913 was 620,000 tons of iron and 468,000 tons of steel.

The De Wendel works, probably the most powerful in Europe, have always been French. The Aciéries Thyssen and the Aciéries de Rombas were entirely German. The Aciéries de Knutange were German with a certain amount of Belgian capital. The production of these various establishments consists principally of blooms, billets, rails and rolled steel.

Besides the plants mentioned, there are located in Lorraine the following blast furnaces: Hauts Fourneaux d'Uckange at Uckange, with 6 blast furnaces of 150 tons (1913 production 261,000 tons of iron); Hauts Fourneaux de Thionville at Thionville, with 4 blast furnaces of 250 tons (1913 production, 316,000 tons); Hauts Fourneaux d'Ottange at Ottange, with 3 blast furnaces of 120 tons (1913 production, 144,000 tons); Hauts Fourneaux d'Andun-le-Tiche at Andun-le-Tiche, with 4 blast furnaces of 180 tons (1913 production, 260,000 tons); Hauts Fourneaux de Redange at Redange, with 3 blast furnaces of 100 tons (1913 production, 91,000 tons). Of these five companies, the first four were entirely German owned, while the fifth included about 40 per cent French capital.

## New French Owners of Lorraine Works

The German iron and steel works of Lorraine were put under French direction as soon as possible after the armistice, and the work of liquidating them has been going on since that time. French iron and steel companies which have suffered by the war were given preference in the purchase of such properties. Payment could be effected by releasing their claims on the Government for all or part of the indemnity due them for damages caused directly by the war. Taking advantage of the occasion offered, a large number of French firms in the iron and steel industry formed associations, or "groupements," for the purchase of the Lorraine properties.

The Aciéries de Rombas (Rombach as known in Germany) have been purchased for 125,000,000 francs (\$24,125,000, at par) by the Société d'Etudes et Enterprises Industrielles d'Alsace-Lorraine (also known as the Société Lorraine des Aciéries de Rombas), composed of the Compagnie des Forges et Aciéries de la Marine et d'Homécourt, Société des Aciéries de Micheville, the Compagnie des Hauts Fourneaux et Fonderies de Pont-à-Mousson, the Société des Aciéries de France, the Société de Fives-Lille, and the Société des Forges d'Allais.

The Aciéries de Knutange have been purchased for 107,000,000 francs by the Participation Minière et Metallurgique d'Alsace-Lorraine (also known as the Société Metallurgique de Knutange), the principal administrator being the Société des Aciéries de Micheville.

The Aciéries Thyssen (now known as the Forges et Aciéries d'Hagondange) were purchased by the Groupement des Consommateurs de Produits Metallurgiques. The purchasers of the Forges et Aciéries d'Hagondange include a number of automobile manufacturers and steel plants, among others, Renault, Panhard, Brasier, Citroën, Clement-Bayard, Delaunay-Belleville, Peugeot, Schnieder, Aciéries d'Aulnoy-la-Fère, Doremieux, Fabriques de Fer le Maubeuge, Cail, Forges de Commentry, Groupe des Fondateurs Est-Centre, Forges d'Anzin, Japy Frères, Société Alsacienne de Constructions Metalliques, etc.

The Hauts Fourneaux d'Andun-le-Tiche have been bought by Le Syndicate de l'Alzesse. The Hauts Four-

neaux d'Ottange were sold to the Aciéries de la Marine. The head offices of all of the above newly constituted organizations are located in Paris.

#### Labor Troubles—German Steel Workers Needed

Just after the armistice small-sized riots occurred in many of the plants; the workers made demands and received about everything they asked for. At the Forges et Aciéries d'Hagondange, for example, the newly arrived French director was obliged to agree to a demand made by the men for a premium on account of the danger suffered by the workmen from air raids during the war. This one item involved about 1,500,000 francs. These troubles are said to have been the result of unrest and agitation caused by German elements in the factories. Naturally, at the time of the armistice a large proportion of the workmen were of pure German extraction. Since that period there has been a gradual sifting out of this element, most of them being sent back to Germany. The workmen here, as elsewhere in Alsace and Lorraine, were divided into four classes, as follows: Class A, those of pure French or Alsatian origin; class B, of French-German or Alsatian-German birth; class C, of foreign origin, and class D, of pure German birth. Great restraint has been exercised by the French in sending back to Germany metallurgical workers in class D, the wisdom of such a course being evident when it is considered that a very large proportion of these men were in the highly skilled class and difficult to replace.

Persons placed in class D, however, are subject to deportation in case their presence becomes a source of annoyance to the French authorities. This tolerance on the part of the French is said to be partly responsible for a general strike of the metallurgical workers during part of September and October last resulting in an almost complete cessation of production. Measures have been taken to avert a recurrence of labor troubles, and there is now little fear on this score. In the Forges et Aciéries de Hagondange at the present time about 68.5 per cent of the workers are listed in class A, 5.6 per cent in class B, 14.4 per cent in class C, and 11.5 per cent in class D. Work in the steel plants is divided into three shifts of eight hours each. Consideration is being given to the employment of a considerable amount of foreign labor, in order to bring the production up to the pre-war standard. The total number of workers at present is about 22,000.

#### Fuel Comes Slowly from Germany

When the French took over the plants many were found to be in a run-down state, due to intensive exploitation and lack of upkeep during the latter period of the war. In many cases damage was deliberately done to the machinery by the Germans. During the past year a very large part of this damage has been repaired, and the majority of the plants are in very fair condition.

At the present time the Lorraine plants are turning out only about one-third of their pre-war production. This is due principally to the lack of coke for the blast furnaces. Before the war France consumed about 12,500,000 tons of coke, of which it produced only about 6,200,000 tons. The resulting deficit is augmented to the extent of 4,900,000 tons by the annexation of Lorraine, of which the production is slight, making a total deficit of 11,100,000 tons. It is true that the French acquisition of the Saar opens to them rich sources of coal supplies. Unfortunately, the coke produced from this coal is of such a friable nature that it can be used only in small or very medium-sized blast furnaces, being quite unsuitable for the large blast furnaces of Lorraine. Coke could be imported from England, but the cost of transport renders supplies from this source practically prohibitive. A similar objection applies in a smaller degree to coke from Belgium, which, moreover, is available only in limited quantities and is of inferior quality compared with German coke. The Lorraine blast furnaces must con-

tinue, therefore, to find their coke in Germany. By the terms of the armistice, Germany was supposed to furnish France 11,000 tons of coke daily. This contract was not adhered to, the Germans alleging various reasons for the non-delivery of the coke in the stipulated quantities, especially strikes in Westphalian coal regions and lack of transports. On May 7 an agreement was reached whereby Germany was to receive 1½ tons of iron ore for each ton of coke sent to Lorraine, Luxemburg, Saar, or Meurthe-et-Moselle. Germany should now furnish France with coke to the extent of 13,000 tons a day. Although the amounts received during the latter part of 1919 were far greater than those of preceding months, they did not exceed one-half the quantity stipulated. This is a source of much embarrassment to the Lorraine industry, which hesitates to contemplate a future of entire dependence on Germany for coke.

#### Transport Difficulties—Need of Steel in Germany

The existing railroad crisis in France also contributes in a large measure to the difficulties experienced by the Lorraine steel plants. Not only is railroad transportation lacking for the carrying of coal and coke, but even for the hauling of the finished and partly finished products to centers of consumption in France. It is only by making a special effort that the products of the Lorraine steel mills are made available for the very pressing needs of the devastated regions and other sections of France, where the demands are far greater than the supplies. On the other hand, it is comparatively easy to export via the Rhine, which may account for shipment to England last August of 40,000 tons of iron and of 10,000 tons to Italy. This was sold at a time when a keen demand existed in France.

An interesting note, which incidentally illustrates the great lack of iron and steel in Germany, is the fact that one of the former German proprietors of the Forges et Aciéries de Hagondange has recently endeavored to enter into negotiations with the French director of this firm for the purchase of an important quantity of iron and steel for shipment to Germany.

#### Probable Future Export of Lorraine Steel

Due to their location, the Lorraine iron and steel plants are particularly favored for exporting, and it is probable that when normal conditions are attained a large proportion of their products will be marketed abroad. Existing navigable waterways provide an outlet from Metz, along the Moselle, to the Rhine-to-Marne Canal, by which goods may be shipped to Strassburg and down the Rhine. Preparations are being actively pushed for the construction of a canal from Metz to Thionville, with branches extending into the valleys of the Orne and the Fentsch, thus connecting the heart of the Lorraine mining and metallurgical district with waterways reaching to the Atlantic Ocean.

In 1913 Lorraine produced 3,870,000 tons of pig iron, or about 20 per cent of the total German production. The return of Lorraine, therefore, will increase the French production from 5,207,000 tons to 9,077,000 tons. The consumption of Lorraine is 2,520,000 tons, raising the total French consumption from 5,144,000 tons to 7,664,000 tons. French exports of pig iron—127,000 tons in 1913—should be increased to 1,413,000 tons, or more than 11 times greater than before the war. In 1913 Lorraine produced 2,286,000 tons of steel, as compared with 5,093,000 tons for France, making a total of 7,379,000 tons. The estimated Lorraine consumption is 271,000 tons, leaving a margin of well over 2,000,000 tons of steel for export from that district.

In 1918, due to the destruction of the mills in the north and east of France, the production of iron from those regions was reduced by two-thirds and that of steel by more than one-half the pre-war figures. This deficit is very largely filled by the Lorraine works, which are in a position to furnish a most precious

(Continued on page 1039)



# Practical Plans to Carry on Safety Work

Governor Sproul of Pennsylvania Pledges Hearty Support of the State—Whiting Williams Makes Strong Appeal for Shorter Hours—Weaknesses of Foremen Discussed

**S**PEAKERS of nation-wide repute and industrial leaders of Pennsylvania and many from other states, were in attendance at the first annual Pennsylvania Safety Congress, which was held in Harrisburg March 24 and 25. This congress is a continuation of the welfare and efficiency conferences of the past, which have been discontinued since 1917 because of war conditions. Large attendances were had at all sessions. All meetings, with the exception of those on the first day in city churches and the Central Y. M. C. A., were held in the chamber of the House of Representatives, while a safety exhibit was held in the ball-room of the new Penn-Harris Hotel.

The "safety first" movement is nothing new to the industrial state of Pennsylvania, having been of prime importance in the conferences of which this was a continuation. Much of definite value was derived from the congress. The social side was minimized and those in attendance had a busy five days with but one social event as a diversion.

In speaking of the purpose of the congress, Commissioner of Labor and Industry Clifford B. Connelley said: "The demands of the great war upon industry and the consequent lowering of standards of industrial safety, the period of readjustment and the consequent industrial unrest make it imperative that Pennsylvanians rally to meet the challenge of the hour. This congress is the forerunner of a practical program for industrial safety that will touch every industry of the Commonwealth."

## Governor Sproul's Pledge

With the purpose so outlined, definite steps for a more practical program were practically insured by the pledge of Governor William C. Sproul in a speech Monday night when he promised the absolute support of the state government to the Department of Labor and Industry in its efforts.

One of the events of especially far reaching importance was the announcement by Dr. Thomas E. Finnegan, State Superintendent of Public Instruction, that a bureau of Americanization is in contemplation at the State capitol. With an unusually large percentage of the State workers of foreign extraction and many of them unable to speak the English language to any extent, much of good is foreseen for industry in the working out of this promise.

Dr. Riley M. Little, Director of the Safety Institute of America, New York, who has made a wide study of industrial accidents, and their cost, estimated that the economic loss in industrial accidents in our country every year amounts to more than \$200,000,000. He said: "Industrial accidents each year result in a loss of time of four weeks or more for the workers, on an average. At least 15,000 of them result in permanent partial disabilities."

## Surprising Lack of Uniformity

Exclusion of various classes of industrial workers from compensation acts was sharply criticized by Dr. Royal S. Meeker, commissioner of the United States Labor Statistics Bureau, who said in part: "An analysis of workmen's compensation laws in the different States shows a most surprising lack of uniformity not only as to the industries and occupations covered but also the waiting period, the amount of money compensation, and the medical benefits provided."

Dr. Meeker closed by urging that steps be taken to enlighten all employers and employees as to the benefits of the compensation codes, saying that it would overcome losses and bring about better relations.

"A dark shop is a dangerous shop," declared C. W. Price, general manager of the National Safety Council, of Chicago, who spoke in favor of well lighted work

places and analyzed studies made of accidents in the United States and Great Britain. The British inquiry, he said, had showed 10 per cent of accidents directly traceable to inadequate lighting and that in 13 per cent the same cause was a contributory factor. Comparing four midwinter months with four midsummer months, there were 39½ per cent more men injured by stumbling and falling in winter than in summer, he said. Light, he added is indispensable for efficiency as well as for safety. He closed by saying "keep walls white and windows clean."

## Selection of Foremen

Care in selection of foremen who will instruct their gangs and encourage individual initiative so that laborers may rise, was urged by Whiting Williams, director of personnel, Hydraulic Pressed Steel Co., Cleveland, Ohio. Mr. Williams had worked for months in labor gangs to find out what was the matter with them. He said too often foremen hold back men who show aptitude through fear of losing their own jobs. Mr. Williams made the suggestion that Americans should learn the languages or dialects of the element from which labor is recruited in their localities so that they can get to understand the workers' viewpoint. "The instruction I got when I worked with the gangs was not from my foreman, but underground instruction from my fellow workmen."

Declaring the waste due to the present state of relations between foremen and workmen is so colossal as to make a very serious increase in the cost of production, Mr. Williams added:

## The Biggest Trapdoor

"I think that the biggest and the most serious trapdoor in this whole matter is not so much in the foreman's bad teaching as it is in the feeling that many of the foremen are trying to hog away from the workman the satisfaction that workman has in his work. The foreman can fall back on the mystery of his position—foremanship. That helps to a satisfaction which I am sure is a tremendous obstacle to the laboring gang. The conviction of doing your work well and giving all you have does not get you anywhere if you are anxious to be a foreman. There is only one way—you have to begin to lay your plans by the benefit of pull. The conviction that doing your work well will get you nowhere sinks down to the bottom and adds to the general distrust on the part of the worker and the organization generally. In looking over a group of questionnaires filled out by a man who had been interviewing a lot of radicals recently, every one of those workers had the feeling that the foreman was a traitor. The workingman realizes that the only way he can get back at the foreman is to get back at the company, through the foreman. The company, therefore, is paying the price of the worker's ill-will toward the foreman. I am inclined to think that the very biggest item in ill treatment is not so much the oaths as the primary refusal of the foreman to share with the worker the satisfaction of that worker being a good one.

"The economic waste due to bad relationship between foreman and workman is causing very serious increase, I am sure, in the cost of production and, therefore, in the cost to the consumer. We must give thought to the foreman's satisfaction in our modern industry and see why he finds it so hard to get through with the better degree of relations and see whether it is his fault or a fault that we are particularly responsible for.

## Necessity of Better Hours

"Noise interferes with efficiency. In many plants, the foreman has to give up all thought of really sitting

down and having a talk with the worker by tongue. He has to point with his finger or using his hand because the employer has not made it as easy as he could by having the least noise possible in the plant. The smoke and heat also make it a hard proposition for the foreman to come through. I feel absolutely sure that every ounce of sweat, every grain of dirt and smoke either has to be paid for at so much per hour or it means that that particular job will get only the lowest kind of workingman. It seems to me absolutely impossible to expect a foreman to be a decent effective leader of men when he and they work there 12 or 13 hours every night with an 18 or 24 hour turn every Sunday. I am perfectly sure that we have no right to expect a better degree of leadership until we begin to give them better hours. Ninety-eight per cent of the disputes that came up before the Labor Board were found to rest upon disputes of the foreman and the labor gang. A large percentage would be found to have arisen when both the foremen and the workmen were tired. We cannot get at the whole problem of a better foreman until we look at these matters of working conditions and working hours."

#### Various Phases of Safety

Accident prevention is a great economic necessity in our national life, declared Marcus A. Dow, general safety agent of the New York Central lines. He made the point that the shortage of man power that now exists redoubles the importance of conserving men and adherence to safety rules. The employer must co-operate more than by putting safeguards in a plant and the community must "establish an atmosphere of safety in public places."

The Rev. Dr. John McDowell, New York, spoke on safety as a community proposition, urging that each town and city should strive to show a minimum of accidents. F. L. Hurlburt, of the E. I. du Pont de Nemours & Co., made a plea to get the workmen interested in safety.

Support of the State administration to every effort to better the condition of workers of the Keystone State so that Pennsylvania, pre-eminent in industrial enterprise and output, will rank as high in humane and advanced methods for welfare of its people was pledged at the Monday evening meeting by Governor William C. Sproul, who said in part:

#### Governor Sproul's Ambition

"I am ambitious to have Pennsylvania lead in the things that are worth while. We have a great advantage in most of the material things. We have been endowed by nature with a territory almost unequalled, probably entirely unequalled on the face of the earth in its natural richness.

"With all of our advantages and natural richness we ought to stand first in everything which makes for the betterment of mankind. We should stand absolutely first on account of our industrial status. Here we are, despite the rivalry on the other States, still in the lead of the mineral production of this country, so far a leader that our mineral production in Pennsylvania is equal to that of any other three states in the Union, combined. That is something to be proud of. At the same time we have an industrial pre-eminence which is conceded everywhere. Pennsylvania is the greatest industrial State in the Union. It also lines up well with others like Kansas and Missouri in agricultural pursuits.

"We want to be proud in accomplishing progressive advances, planned like the things which you are working on here. Pennsylvania has the means and it has the disposition to take an absolute leadership in the safeguarding of the industries and in the rehabilitation industries' cripples.

"To-day, I had the pleasure of signing the first of the documents for the education of a lad being taken care of under our new rehabilitation plan—a boy who lost his arm in an industrial accident and whom we are going to give the very best chance and opportunity that we can. We propose to follow this out and develop it and if we stay around here as long as we hope to, we will show great advances to Pennsylvania in the

working out of the new law which was passed in the last session of the legislature."

Dr. A. A. Hammerschlag, president of Carnegie Institute of Technology, Pittsburgh, appeared for Charles M. Schwab, who was unable to be present. He said that the time is coming when some of the burdens will be lifted from the workers.

#### Public Utility Hazards

A symposium on "The Public Utility and its Hazard" took place at the Tuesday morning session. Speaking from the "steam railroads" viewpoint, T. H. Carrow, supervisor of safety, Pennsylvania Railroad Co. of Philadelphia, said the importance of safety education and regulation has been demonstrated on the railroads. On the Pennsylvania railroad in 1919, he said, there was reduction of 204 or 36 per cent in the number of employees killed and a reduction of approximately 5,000 or 14 per cent, in the number of employees injured. James R. Douglas, United Gas Improvement Co., speaking from "the gas company angle," told how specialized efforts had cut down the number of accidents in his company's service by 46 per cent in 1919 as compared with 1918. "The safety propaganda is one of the greatest savings that can be brought about in the electric railway industry, said Edward C. Spring, general manager of the Lehigh Valley Transit Co., Allentown, Pa., speaking for the electric railways. C. B. Rice, of the Pittsburgh Railways Co., speaking on the safety movement in the electric industry, said "continuous education of the public and continuous improvement on safeguards are vital for safety."

Announcement that a bureau of Americanization is in contemplation at the State Capitol was made by Dr. Thomas E. Finnegan, Superintendent of Public Instruction. Dr. Finnegan presided at the meeting which had "Americanization" for its subject, and was addressed by E. E. Bach, of the State Welfare Commission, Harrisburg; Charles B. Prichard, director of the Pittsburgh Department of Public Safety, and F. H. Rindge, of the industrial department of the Y. M. C. A., New York City.

Dr. Finnegan said: "I have assurances that the department which I represent is to be given sufficient means to organize and make effective a bureau of Americanization. Several departments of the State Government are in intimate relation with this great subject and we shall have the co-operation of their people." The superintendent urged that committees take up the subject and work out a definite program. This is not an impossibility, as many believe, he said, and if the State sets its face toward it, success will follow.

#### Foreman Discussed

The foreman and his important relation to the organization and maintenance of safety regulations in Pennsylvania industrial establishments, was the subject of a round table discussion. The foreman came in for some sharp criticism, but also had his defenders among the safety engineers, supervisors, employment chief and personnel managers who made up the audience.

John A. Oartel, safety engineer, Carnegie Steel Co., Pittsburgh, served as chairman of the meeting and gave some of his experiences.

George T. Fonda, Bethlehem Steel Co., Bethlehem, Pa., declared the foreman was a "pretty busy fellow" and to make any safety movement effective the foreman had to be a part of it. He said in part:

"I would point out three things which I believe are of major importance in analyzing the foreman's relation to the safety committee.

"1. Show him through a properly organized system of education, that he has an important function to perform by being an actual member of the safety committee.

"2. Establish the belief in the mind of the foreman that the 'big boss' is backing safety 100 per cent and convince him that this is true.

"3. Take into account that the average foreman has troubles of his own and must be reminded from time to time of his general relationship to safety."

Mr. Fonda concluded: "After all, we must realize that the foreman is just as human as the rest of us, but he is not superhuman and can't do the impossible. Treat him with consideration and give him a half a chance and I'm satisfied that he will do his part on our safety committees and in promoting the many things that fundamentally rest upon his shoulders for support."

"Foremen are made, not born," declared E. C. Ramage, employment agent of the Carnegie Steel Co., Braddock, Pa., "It is my opinion," he said, "that an apprenticeship course for the training of foremen should be in operation the year round in every industrial plant. We are not yet teaching our foremen a method whereby they can eliminate the friction and financial loss caused by a huge labor turnover."

He said: "You must catch them young and train them up in the way they should go, for the foreman is the man who makes for production and the results of

production is what the paymaster hands us on the first of the month."

The Congress proper was concluded on Wednesday night. Theodore Roosevelt, Jr., New York, and Samuel Gompers, president American Federation of Labor, were scheduled to attend this session, but did not appear. Matthew Woll, Philadelphia, vice-president of the Federation, spoke for Mr. Gompers.

Mr. Woll said, "Organized labor realizes the great human element that is present in industry and it is their aspiration to bring in the human relationship in industry just the same as it predominates in all other relations in life." Mr. Gompers sent a message in which he said: "Every machine can be made safe. It is possible to remove the risk of industry to life and limb from almost the entire field of industry."

The session concluded on Thursday, March 25, with the tenth conference of industrial physicians and surgeons.

## Detecting Defects in Metals With the X-Ray\*

Method at Present Limited to Thicknesses of 1.50 Inch

—Examination of Forgings—Experimental Results

BY W. E. RUDER

UNFORTUNATELY we are, at present, limited in examining metals by means of a fluorescent screen, such as is used by physicians, to about 0.01 to 0.02 in. thickness of metal and obviously internal flaws in such thicknesses would be relatively unimportant. For the examination of a manufactured article, for the inspection of assembly, the screen has been successfully used. For most purposes, however, a photographic plate must be used so that the cumulative effect of time may be utilized.

Radiographs are detail shadowgraphs and as the rays cannot be focused as in ordinary photography, the image will always be life size or larger. Moreover, the rays producing the shadows are not parallel but emanate from a point source. For this reason variations in intensity caused by differences in density in the object will be sharper when near the emergent side, and their sharpness will diminish and their size apparently increase as they are nearer to the incident side. This point source of distortion is diminished by increasing the distance of the tube from the object, at the same time, however, decreasing the intensity of the rays.

Most important, however, is the protection of the operator from the action of both the direct and secondary rays. Owing to the high penetrating power of the rays used, protection is even more important in metal radiography than in radio therapeutics. Too great care cannot be taken to guard against these rays, and complete protection should always be provided.

### Present Apparatus and Limitations

With the best apparatus at present on the market, the metallurgist will be limited to the use of a 10 in. (100,000 volt) spark gap. This will require an exposure of about 3 hours at 5 milliamperes to radiograph 2 in. of metal. This represents the present practical limits of the process. Of course, for purely research work, much higher voltages are available and have been used, making the practical radiography of greater thicknesses of steel, a thing to be reasonably looked forward to, but for the present, this is still in the hands of the X-ray tube engineer.

There is another difficulty met with in radiographing greater thicknesses and that is that any flaws to be detected must be proportionately larger as the piece is thicker, particularly if located at any appreciable distance from the photographic plate. The scattering effect of the large mass between the flaw and the

plate will, during the long exposure required, so fog the outlines of the image that it may not be visible, and even though a radiograph can be made, it will not, with any degree of certainty, show the presence of flaws really existing.

The table gives results of experiments showing the time of exposure under varying conditions which gave

Table of Results of Experiments on Time of Exposure for Good Radiographs

Thickness, in.	Spark Gap, in.	Expt. M. A., Min.	M. A.	Distance Source to Plate, in.	Remarks
0.375	10 (25.4 cm.)	10	4.0	11	No screen
0.375	10 (25.4 cm.)	2½	4.0	11	With screen
0.5	11 (28 cm.)	7	2.0	20	No screen
0.55	10 (25.4 cm.)	128	4.0	..	No screen
0.55	10 (25.4 cm.)	30	4.0	..	No screen
0.50	13 (33 cm.)	4	..	20	No screen
0.50	15 (38 cm.)	1	..	20	No screen
0.56	15 (38 cm.)	2.5	1.25	20	With screen
0.87	10 (25.4 cm.)	160	4.0	15	No screen
0.87	10 (25.4 cm.)	36	4.0	15	With screen
0.95	10 (25.4 cm.)	60	4.0	15	With screen
1.00	10 (25.4 cm.)	112	4.0	12	With screen
1.00	11 (28 cm.)	45	..	20	No screen
1.00	13 (33 cm.)	19	..	20	No screen
1.00	15 (38 cm.)	10	..	20	No screen
1.50	15 (38 cm.)	90	..	20	With screen
2.16*	10 (25.4 cm.)	650	6.0	?	?
0.75	10 (25.4 cm.)	5.6	2.8	22	?

\*Copper.

good radiographs, and may serve as a practical guide for the determination of the time necessary. Seed X-ray plates were used.

### Examination of Forgings

The examination of forgings for flaws presents greater difficulties than castings because such flaws usually occur as hair line cracks or lines which, unless they happen to run almost parallel to the path of the rays and in a straight line, would not be visible on the negative. Even under these favorable circumstances, differences in density due to these defects are difficult to detect, for the radiograph does not enlarge and shows only such defects as would be visible if exposed to the naked eye.

In order to determine the thickness of the smallest air inclusion which could be distinguished radiographically, two plates of steel were machined and ground to flat surfaces. In one of these a slot was cut to give a wedge of air of varying thickness. Each plate when finished was ¾ in. (15.5 mm.) thick. The two steel plates were then bolted together and radiographed at 15 in. (38 cm.) gap. In this manner it was found that an air inclusion 0.021 in. (0.5 mm.)

\*Abstract of a paper presented at the fall meeting in New York of the American Iron and Steel Institute. The author is metallurgist with the General Electric Co., Schenectady, N. Y.



could be detected in 1¼ in. (32 mm.) of steel and an air inclusion 0.007 in. (.2 mm.) could be detected in a total thickness of ¾ in. (15.5 mm.) of steel. This is of course under the most favorable conditions, when it was known beforehand that the inclusion existed and just where it was.

#### Conclusions

To summarize: From the point of view of those who are interested in the metallurgical application of X-rays, the following conclusions may be drawn:

The practical application of metal radiography in

the work-shop, bearing in mind time of exposure and available apparatus, is at present limited to about 1½ in. of steel.

For purely research purposes and with special apparatus, somewhat greater thicknesses are possible of examination, but the results are increasingly harder to obtain and more difficult of interpretation as the thickness increases.

Only such inclusions as would, if exposed, be visible to the naked eye can be detected; hence the detection of hair line cracks or of very small sonims is very uncertain.

## NEW ENGLAND FOUNDRIES

### Indications of Unusual Prosperity—Numerous New Enterprises

More activity is noted in the New England foundry field than ever before. During the war most of the foundries in that section of the country enjoyed unusual prosperity, but since the armistice they have been more busy and more prosperous than ever, largely the result of the activity in automobile, cotton and woolen machinery and in machine tool industries.

Cotton machinery interests in some instances have increased their foundry facilities, but are still obliged to let out a large amount of work to independent foundries. The General Electric Co. has been obliged to increase its foundry capacity by additions to owned properties, the purchase of foundries, or by leasing plants, and still is unable to keep up with its casting requirements. Other large New England industries have or are passing through the same experience.

But where one finds the greatest activity is in the smaller foundry field. New interests, attracted by the business outlook, are entering the foundry field. Those foundries, no matter where located, which have been obsolete or practically so are being reopened or operated on a larger scale, and foundries which for years have been operated as a private business are being incorporated under the laws of the various New England States, but especially Massachusetts and Connecticut, their activities having become sufficiently important to warrant the owner or owners shifting the responsibility of liability. Hardly a day passes but one or more foundries are incorporated somewhere in New England, and more foundry equipment has been sold there during the past six months than in any similar period prior to the war.

Labor is enjoying its share of the foundry prosperity. Effective April 1, molders and core makers in Lawrence, Newburyport, Springfield, Mass., and vicinity, go on a \$7.20 per day basis, as contrasted with \$5.80, as heretofore. It is believed the molders and core makers in Worcester, Mass., will go on the \$7.20 per day basis on or about April 15. The Boston foundrymen have an agreement with their employees running to July 1, which calls for the \$5.80 per day rate.

The Gardner-General Foundry Co., Gardner, Mass., is to increase its capitalization by an issue of \$200,000 8 per cent cumulative preferred stock, or 2000 shares, having a par value of \$100 each. No official statement has been given out in connection with the new stock issue, but it is reported the company contemplates extensions. Ralph N. Wiley is president and treasurer of the company.

Among the recent Massachusetts incorporations is the Colonial Foundry & Machine Works, Inc., Boston, capitalized for \$50,000, divided into 3000 shares of common stock, par \$10, 1000 of which have been issued, and 2000 shares of preferred, par \$10, with a foundry at 110 Crescent Avenue, Chelsea, the property of the W. A. Snow Iron Works, Inc., Boston. William A. Snow, 32 Portland Street, Boston, is president of the new corporation, and Thornton A. Snow, 158 Summer Street, Somerville, treasurer.

The Brightwood Bronze Foundry Co., Springfield, recently incorporated under Massachusetts laws with a

capital of \$155,000, divided into 1050 shares of common stock, par \$100, and 500 shares of preferred, par \$100, is closely allied with the Satin Mfg. Co., Springfield, another recently Massachusetts formed company, the officers interlocking. The foundry will occupy approximately 8500 sq. ft. of space at 369 Birnie Avenue.

At Hartford, Conn., during the past week, the following new corporations were formed: The Bridgeport Brass Foundry Co., Inc., Bridgeport, capitalized for \$25,000, divided into 250 shares of \$100 each, the incorporators being Ralph Johnson, 530 Newfield Avenue; H. A. Rorabach and T. C. Lynch, all of Bridgeport; the Derby Castings Co., Derby, capitalized for \$25,000, divided into 1250 shares, par \$20 each, C. H. Stokesbury, 112 New Haven Avenue, and S. C. Conlon, both of Derby, and J. W. Beecher, Watertown, Conn.

The Hercules Moulding Sand Co., Inc., has notified the secretary of Massachusetts of a change in the classification of its stock. Heretofore there were 20,000 shares of stock, but now 10,000 shares of common, and 10,000 shares of 8 per cent cumulative preferred. The company owns about 130 acres in Wayland, Mass. John M. Forbes is president of the company and Christopher H. Rogers the treasurer.

The Everett, Mass., foundry of the G. W. Bent Co., Boston, bed manufacturer, is to be under new management hereafter. Byron Greatrex, who has been associated with Lynn and Salem foundries, has agreed to take over the Everett plant and make a certain number of castings for the Bent company.

The Premier Warm Air Heater Co., with capital stock of \$300,000, has been organized by local capital in Dowagiac, Mich., where a plant will be built and ready for occupancy about Aug. 1. The contract has been let to Byers Brothers Construction Co., Kalamazoo, Mich., and much of the building material has been purchased. The first unit of the plant will be a concrete, brick and steel structure, 120 x 360 ft. Officers of the company are: William F. Judd, president; Harry L. Wood, vice-president; C. C. Sinclair, secretary; Richard M. Judd, treasurer; Ralph S. McNaney, superintendent. On the board of directors are Dr. William M. Cory and E. Bruce Laing.

Many types of mechanical mucking machines have been developed, several of them by engineers in the Lake Superior region. These are under trial or in regular use in many places, and the underground loader is further along than many mining people appreciate. One machine built at the shop of the McDougall Shipbuilding Co., Duluth, has already been sold in various mining districts to the number of 80 or 90, and is in use in the Lake Superior iron and copper regions, in the Arizona copper districts, in the southwestern zinc country, in Butte and elsewhere. Recently seven of these loaders were ordered for Japan.

The Drake Lock-Nut Co., San Francisco, which is entering foreign markets with sales of its lock-nuts, has arranged to quote foreign buyers prices c.i.f. any large port. George F. Drake, general manager of the company, has investigated freight rates and finds that with a slightly lower discount from the list price, ocean freight rates to many foreign ports can be included in prices.

## MARKET OF THE FUTURE

### J. D. W. Snowden Sees Brazil a World Power— Demand for Machinery—American Salesman a Success

"Within 50 years Brazil will rank as one of the world powers," says J. D. W. Snowden, representative of the American Steel Export Co. in Rio de Janeiro, who is in New York on business until June, when he will return to Brazil. Mr. Snowden speaks enthusiastically of the country as the greatest of the Latin American nations, not only in territory and population but in natural resources and a desire for progress. "Brazil," Mr. Snowden says, "has a better understanding of the Monroe Doctrine and what it intends than any of the other South American countries, and the Brazilians show a particularly friendly desire to co-operate with the United States in every way. Brazil has few friends among the other nations of the southern continent and naturally looks to the United States as her strongest friend and ally." Mr. Snowden believes that if this desire for co-operation and progress is cultivated, the country with her army of 500,000 men will prove a valuable ally in the maintenance of peace and prosperity in the western hemisphere.

#### Many Obstacles to Progress

Mr. Snowden, who has traveled extensively in the country during his residence in Rio de Janeiro, pointed out several of the economic obstacles that must be surmounted on the road to progress. Although the population is more than 28,000,000, it consists of a large percentage of Indians and half-breeds, and illiteracy is common, there being only about 7,000,000 of the educated Brazilians, who govern for the rest of the population. Even elementary education is not compulsory at present, as the government fears that the illiterates in the population would look upon such a law as an invasion of their rights, but schools are being provided in widely separated sections and intelligent Brazilians expect to see a day when education will be general. Another condition that may have tended to retard progress in industry is the division into what are practically independent states caused by the geography of the country. In many respects Brazil is passing through much the same stages of progress politically as the United States did in the years following the revolution. These states, collecting heavy interstate revenues, have tended to develop small local industries and prevent the formation of large business organizations.

#### A Market for Machinery

Speaking of present and future trade with Brazil, Mr. Snowden explained that Rio de Janeiro ranks low in imports among the South American nations. Many manufacturers read the large figures of imports for Buenos Ayres and comparing them with the figures for Rio de Janeiro, form the conclusion that Brazil is not a good market. The fact is, that while Buenos Ayres includes 25 per cent of the population of the Argentine, which is of a high standard of literacy, Rio de Janeiro represents only about 4 per cent of Brazil's population, and there are other ports in the country, of equal importance, developed largely because of the poor transportation facilities. But Brazil is developing rapidly both in agriculture and manufacturing. Owners of plantations are discovering the value of American tractors and the manufacturers of the country, who are in many instances using old-fashioned German-made machinery, are easily interested in the more modern, quantity-production machines manufactured in the United States.

#### American Salesman a Success

Asked his opinion as to the type of American salesman now traveling in Brazil, Mr. Snowden said that from what he had observed and had been told by Brazilians of the type of 5 or 10 years ago, there is a great improvement. To-day the merchant is meeting the real American instead of the German-American, Austrian-American or other naturalized foreigner, for-

merly considered the proper type to send as a business representative. The real American salesman is proving a success, even more of a success than the British or German agent. Although the British are undoubtedly highly successful foreign traders, the average Englishman is inclined to live in a colony of his own people, associating with them almost exclusively, while the German, although he learns the language and speaks it fluently, seldom gains the entire confidence of his clients. The American, on the other hand, while he is no such linguist as the German or Austrian, is much more inclined to speak the language well than the Englishman and will as a rule select his close friends from among the Brazilian business men, forming what often prove to be lifelong friendships.

Although Mr. Snowden believes that we are gradually losing to England and Germany much of the trade that sprang up during the war, some will remain and a solid export business will be built up, greater than we have ever had before. The greatest obstacle to American trade for many years will be the question of credits. We lack the elastic system which the Germans and British exercise when necessary, and our foreign banking is still in its infancy compared to the banking methods of our rivals. Another factor is our laws, which often instead of helping the exporter as do the laws of both Britain and Germany, hamper him and curtail his profits. But there is a note of optimism in the higher type of American salesmen, who is a good mixer and well liked by the Brazilians, that speaks well for our future commercial relations.

#### Portuguese, Not Spanish, Spoken

The greatest mistake made by American manufacturers and others is to classify Brazil as a Spanish-speaking country. Spanish, says Mr. Snowden, is about the most unpopular thing in Brazil, and if correspondence advertising literature or trade journals circulated in the country, for any reason cannot be written in Portuguese, the second choice of the readers is either French or English, and Spanish should be used only as a last resort. French is taught in all schools and almost universally spoken by the better class and a large number speak English. The Brazilians are proud of speaking Portuguese and object to being classified as Spanish-American.

#### Machine Tools in Java

WASHINGTON, April 5.—American machine tools are rapidly gaining an enviable reputation in Java, according to Consul Harry Campbell, who is at Soerabaya. Mr. Campbell says that one of the largest and most successful machine shops in Soerabaya is completely equipped with modern American machine tools and is securing an abundance of orders for shopwork which, it appears, is able to fill more satisfactorily than any of its competitors. It is announced that this concern has recently been awarded the contract for the iron and steel work of a new Government railway terminal at Tandjong Priok, the port of Batavia.

The Park plant of the Bartlett-Hayward Co., Columbia Avenue and Putnam Street, Baltimore, is being offered for sale by the Ordnance Salvage Board, Munitions Building, Washington. Informal bids will be accepted until noon, April 15. No special bid form is required, any proposals submitted in writing being considered. The site is 154 x 1109 ft., on which are erected 11 buildings, having approximately 450,000 sq. ft. of floor space. The buildings are permanent. The machine shops, office buildings, assembling buildings, lunch rooms, oil house, tool house, hospital, toilets, etc., are of mill construction.

E. S. West, manager of power for the Bethlehem Steel Corporation, addressed the engineering students of Johns Hopkins University, Baltimore, on March 31. He pointed out that the really successful engineer in these days and the days to come is not only a skilled technician but a man of the world in the real sense of the term.

# Shop Committees and Stimulated Production

A Discussion From Several Angles Present-  
ing Facts from Managements and Workers  
—Stimulated Output Is a By-Product

—BY DALE WOLF\*

**M**ANUFACTURING concerns have been so long attending to things other than shop committees that they should not expect, in just a few years' time, to be able to produce automatic committees to automatically increase production.

Industrial leaders have been too busy to pay any attention to the workers, until they started safety work, then welfare work, then employment management, industrial relations and personnel departments. And then they started shop committees. And after these had been going for a little while someone had the nerve to ask what the shop committee had done to stimulate production.

In searching around to see what material there could be found on the stimulus side of the subject there was, strange to relate, little to be found.

## The Object of the Shop Committee

What is the object of the shop committee? Is it organized with the idea of increased production, or does it exist as an organization where grievances can be settled?

If you will look carefully into the printed plans of shop committees there is usually a heading under such a caption as "object," or "purpose." As you carefully peruse the various paragraphs on objects or purpose you will have a great deal of difficulty in finding anything in the shop committee plan that says one word about increasing or stimulating production. These paragraphs usually speak about "mutual understandings," "voice of the workers in the management," "management and men meeting on a common ground," etc.

In investigating this subject, it has been the writer's privilege to have the opinions, and what is better, the facts relating to this subject, from the presidents of our largest factories, workers in the plants who are members of shop committees, consulting engineers in management, research workers on shop committees and consultants in employment management. It is the purpose to present here the subject from several angles, allowing the reader to form his own conclusions.

Quoting from a letter of a well-known Ohio firm where there is an employee representation plan, we get a very positive result. It says:

"We produce facts in our platform and not opinions. We are very much pleased with the results obtained by installing such a plan, to say the very least, and our men are contented. For your information we increased production in 1919 over 1918, 5.4 per cent, and reduced labor turnover 43.5 per cent."

And yet, when we read the printed matter which accompanied this letter we find that this company has several financial incentives tied closely to its employee representation plan. And furthermore, we did not find any method of proving to us that the facts were facts, except the word of the writer, and while the point is raised for consideration, it is not to question the veracity of the statement in the letter.

One of the correspondents has reported that Secretary of Labor Wilson is authority for the statement that "shop committees had not accomplished anything constructive, but in reality were nothing more than large grievance committees and induced grievances and complaints, rather than cured them; that the only constructive work that was done was done in institutions that were operating as an industrial democracy, with the representative form of government and which not only gave the people an opportunity to do constructive

things, but encouraged the constructive effort of the workers in the plant."

This same correspondent favored the investigator with many extracts from the minutes of the meetings of shop committees, thus permitting us to see how these committees had stimulated production.

On going through these extracts carefully many instances were found where the members had reported increased production. However, there was nothing to prove that the increase in production had been stimulated by the shop committee. So that the situation may be more clearly understood, it should be noted that these minutes were taken from shop committee meetings where there was a financial incentive connected with the employee representation plan.

## Financial Incentive a Factor

A copy of a portion of a letter from an Indiana factory, which was written to John Leitch was received, and reads as follows: "We have doubled our production since March and that, taking into consideration the length of time it takes to get out our production, we consider a pretty fine showing. I am almost convinced that we are one of the few, or possibly the only manufacturers in the country (in his line) who has been able to increase production, let alone doubling it." This letter comes from a plant that has a reputation for doing things, yet it is a plant where there is a financial incentive working as a direct part of the employee representation plan.

In a private letter from one of America's best investigators of shop committees, he says: "I may say that in the course of the investigation which I supervised (naming the book published as a result of the investigation) I found relatively few instances of any direct result upon production from the activities of the shop committees. In the case of several Leitch industrial democracy plans, substantial increases in production have been claimed, as you are doubtless aware. Personally I am rather disposed to question the evidence offered in this instance and feel, moreover, that whatever effect upon production may have occurred is to be attributed to the collective economy dividend, rather than to the shop committee feature of the plan. In several isolated instances, shop committees have concerned themselves with production problems with alleged favorable results, but I know of no positive proof of the nature which you apparently desire. Personally I am inclined to regard the shop committee primarily as a means of collective bargaining which may influence production indirectly through an improved morale, which is unlikely to have any great direct effect in increasing production."

We hear so much from England about the Priestman Brothers plan in their foundry at Hull. In talking with one of the brothers the other day, he said very frankly that their shop committee plan had increased production, but that the responsibility for the increase was due directly to the extra bonuses paid, these bonuses being a part of the plan.

In an Eastern hardware factory the management feels that any increase in production is merely a by-product of the shop committee work, and that the bonus part of the plan is its most vital feature.

In a letter written by the editor of a leading industrial magazine, we find him saying: "Thus far no facts have come under my observation that seem to me to be conclusive. Many claims have been made, but I question if all of them can be substantiated. From a philosophic viewpoint, it does not seem to me that the purpose of the shop committee is to stimulate produc-

\*Miller Lock Co., Philadelphia.



tion. Its purpose is to organize the relationship between employer and the employee. Indirectly placing that relationship on a proper basis will increase the quantity and improve the quality of production. But it will never be possible to measure one in terms of the other. In fact, if the shop committee is installed with the purpose of getting more product, I fear it will never be a success."

On the other hand, one of our best-known personnel men from Columbus, Ohio, recently wrote something in a magazine, of which he is an associate editor, to the effect that if the shop committee was not intended to increase production, it ceased to serve its intended purpose and should be disbanded.

A man who has probably had more to do with shop committees than any other individual in the United States brings up two or three points for consideration:

1. "If the shop committee, or whatever you choose to call it, has (probably) prevented strikes, it has increased productivity, provided, of course, it cannot be shown that productivity has been lessened by sheer 'laying down.' If employment has been stabilized we can also assume that productivity has, in a sense, been increased.

2. "The past year or so has not been a normal time, and many factors have entered into the situation which might very well have limited production, if not lessened it. One of these is the intangible factor of weariness which seems to have afflicted all of the people of all of the warring countries alike.

3. "Are we sure that our records of production are so kept as to show the influence of such factor as the shop committee?"

Now that last sentence sounds like "passing the buck" over to the management. In talking to the manager of a Philadelphia concern he was positive that his shop committee has stimulated production, by the organization of a booster's committee within the shop committee. When asked if he could prove it and give the facts and figures, he definitely stated that the figures would be forthcoming in just one week. About ten days later a long letter from his personnel man was received saying that while they had been very positive regarding the outcome of their figures at the start, they regretted to say that there was no positive proof that the shop committee had increased production. This was a case where the management did not have the records to really know what the shop committee was doing.

#### The Scope of the Shop Committee

A good deal can be said about the shop committee and the management in increasing production. One friend has said, "The successful achievement resulting from a shop committee can only be accomplished by the proper management of the shop committee organization. So the adoption of a shop committee merely shows an appreciation of the fact that the past management has been wrong, and that a new management must be different."

Another friend says, "If there is to be still further democratization of industry, does it mean that those who have been selected for the managerial positions must be displaced by those who have not proven their ability, or likely to prove unsatisfactory in such positions.

"We believe that much of this shop committee talk is for effect. We do not believe that employees generally expect to have a voice in the management of the business; on the other hand, good business management carries with it the closest possible working relations between the management and employees."

In describing the functions of a shop committee in Cleveland in one of the plants in that city, one industrial relations manager says: "We have a shop committee of the employees' congress functioning on production matters, but the committee can do no creative work. It can follow the production schedule and suggest that the next time perhaps it would be wise to put a certain part through in large lots, or it can suggest that we need a new type machine in order to improve production in the department, or it can investigate into the cases of spoiled work, or it can help

in setting production standards and in teaching new men how to equal these standards. A shop committee can do all of these things, and then, if the management has not done its part of the job, the shop committee has been about as useful as a dog chasing his tail. Does the man at the machine control your purchases? Does he control your routings, or the engineering problems and the broad general policy of just how each of your products shall be made in order to best equal the expected demand?"

A factory starts an advertising campaign, little it knows what will be the results. When you start a shop committee you start an advertising campaign among your workers to upgrade the morale. Propaganda would be a better word. If you want your shop committee to stimulate production, I believe that you must hook up directly to the work of the committee some definite financial incentives to the workers. This will create and instill the confidence of the workers in their committee.

#### Stimulated Production a By-Product

Stimulated production is a by-product, if you please, of the shop committee. Don't start to get your shop committee to increase production. Let it do the work that has been laid out for it, then you will get increased production as a by-product. Have an honest-to-goodness shop committee, one that's on the square, and don't feel sore if you can't see the point where it's increasing production. Such work will come around. You don't generally start to manufacture a by-product, certainly not; the by-product comes after you start the main product through the factory.

Why do you build a big power department in your factory? To furnish power, of course. You use that power to drive your line shafts, make the current that turns your motors and a hundred and one things. But where do you get the heat for your factory buildings these cold winter days? From your by-product, of course. It's that exhaust steam that comes from the power plant that heats your factory buildings. It's exhaust steam, but it's mighty good steam, and it does good work.

Then my personal opinion is that manufacturers with shop committees should start to get hold of that energy that comes off from the shop committee. It will be there just like the exhaust steam, and when they have time enough to pay attention to getting the pipe lines run out over the factory (by pipe lines I mean management lines), then your shop committee by-product will go rushing through those pipe lines of management. The by-product of the shop committee will be increased production along the pipe lines of efficient management.

The United States Civil Service Commission announces open competitive examinations as follows: Assistant mechanical engineer (experimental ordnance) at \$2000 a year; assistant appraisal engineer, \$1800 to \$3300 a year; appraisal engineer, \$3600 to \$4800 a year; senior structural engineer, grade 1, at \$3000 to \$4000 a year; grade 2, at \$1800 to \$2700 a year; senior mechanical engineer, grade 2, \$1800 to \$2700 a year; senior electrical engineer, grade 2, \$1800 to \$2700 a year; fuel engineer, \$4200 a year; assistant fuel engineer, \$1620 to \$2160 a year. All of these examinations are by mail. Appointees at annual compensation of \$2500 or less may be allowed the temporary increase granted by Congress of \$20 a month. Applicants should apply for form 1312 for all positions except that of fuel engineer and assistant fuel engineer, which are covered by form 2118, stating the title of the examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at the nearest custom house.

A load strain-gage test of the 150-ton revolving floating crane recently built for use in the Navy Yard, Norfolk, Virginia, was made by Louis J. Larson and Richard L. Templin, assistant engineer physicists, Bureau of Standards. Details of the test are given in Technologic Paper No. 151 of the bureau.



### Size Comparison of New Bending Rolls

A plate bending roll, capable of bending mild steel plate  $\frac{3}{4}$  in. thick and 35 ft. 6 in. long, has been installed by the Petroleum Iron Works Co. of Ohio, Sharon, Pa. It was made by the Southwark Foundry & Machine Co., Philadelphia. The machine has a total weight of 160 tons. The top roll weighs 45 tons and has a diameter of 30 in. The two bottom rolls weigh 22 tons each and measure 20 in. in diameter. The high speed and roll bearings are bronze bushed; all other bearings are babitted.

This is the fourth large plate bending machine featured in THE IRON AGE this year. That with the greatest distance between housings is the roll which the Southwark company made for the Mare Island Navy Yard in California, which measured 37 ft. The top roll, here pictured, tied with a roll made by the Crucible Steel Co. of America for greatest diameter, each measuring 30 in. The Crucible Steel Co. roll was

the heaviest in weight by 15 tons, weighing 60 tons. The Mare Island roll is guaranteed to handle the heaviest plates, measuring  $1\frac{1}{4}$  in. thick.

The following table points out size comparisons:

*Dimensions of Recent Bending Rolls*

Maker and User	Distance Between Housings, Ft.	Diameter of Rolls, In.	Weight of Rolls, Tons	Maximum Thickness of Plate to be Bent, In.	Total Length of Roll, Ft.
Made by Crucible Steel Co. of America.—(The Iron Age, Jan. 8, 1920).....	35 $\frac{1}{2}$	30	60	.....	40-8 $\frac{5}{8}$ in.
Made by Kling Bros. Engineering Works, Chicago, for General American Tank Car Corporation, East Chicago.—(The Iron Age, Feb. 12, 1920).....	34 $\frac{1}{8}$	Top roll, 29; Bottom rolls 21	40	$\frac{3}{4}$	.....
Made by Southwark Foundry & Machine Co., Philadelphia, for Mare Island Navy Yard.—(The Iron Age, March 18, 1920)...	37	Top roll, 20; bottom rolls, 18	Entire machine, with motors, 247 $\frac{1}{2}$	$1\frac{1}{4}$	.....
Made by Southwark Foundry & Machine Co., Philadelphia, for the Petroleum Iron Works Co. of Ohio, Sharon, Pa.—(The Iron Age April 8, 1920).....	35 $\frac{1}{2}$	Top roll, 30; bottom rolls, 20	45 22	$\frac{3}{4}$	.....

\*The Southwark Company reports that it is now building an even larger machine which will bend plate 40 ft. in length.

## SEVERE STEEL SHORTAGE

### Canadian Consumers Suffer on Account of Slow Delivery of Supplies

TORONTO, April 3.—The Canadian iron and steel trade can see no reflection in improved supplies of the increase in production claimed by the mills. There are a number of Canadian manufacturers now who are right down to the hand-to-mouth proposition, and there are even cases where suspension of operations has taken place on account of inability to secure material. Some of the shipbuilding yards are in a bad way for plates and shapes, other concerns of various natures are in trouble with their power plants because it is impossible to secure the tubes to make necessary repairs. In fact, it is impossible to get a quotation on seamless tubes from Toronto jobbers. A few cars come in occasionally, but there is such an accumulation of demands against these that the arrival of the shipments makes no appreciable difference in the situation.

### Galvanized Sheets Very Scarce

Two very reliable warehousing firms made the prediction to-day that the resale price of galvanized would be around 15 or 16c. per lb. before the summer was over. The demand for these sheets is insistent. There are so many small and large firms all over the country that cannot go ahead without galvanized material that the situation is acute. There is practically only one concern in Canada doing galvanizing for the trade, and so far this country has depended almost entirely on the United States mills for this material.

The majority of the shipments coming in now are from the premium mills or brokers, and there is absolute lack of anything approaching stability in the market quotations. As high as 12c. has been paid by some of the jobbers, and of course the resale runs well over this. There is a feeling of intense opposition to the premium operators, but that is as far as it goes. Jobbers take the material in, set their price,

and it is gone almost at once. The trade knows quite well that it is paying a fancy figure for immediate delivery, but there is no other way out, and it pays most concerns to pay the high price rather than be forced to close their establishments, or parts of them.

### Little Heard of Exchange

In the machine tool market now one hears very little of the exchange situation as between United States and Canada. It has not worked against the sale of American machine tools in this country for the reason that Canadian builders secure considerable of their raw material from the United States, and on this they have had to pay the exchange, causing a corresponding increase in their selling prices. The big problem facing the Canadian dealer in tools is to get something that he can deliver to his prospect in anything like reasonable time. The price, high as it is, still remains a secondary, not a dominating, factor in the situation.

The only place where the price is making a difference is in the buying policy of the supply and small tool departments. As one of the dealers stated to THE IRON AGE, "As a general thing we buy for about a year ahead, but just now we are running on three months' terms. We miss some business, of course, because it is impossible to keep our stocks full on such short buying, but we have adopted the policy of keeping stocks down."

As a general thing, stocks all over Canada are low, no matter what field is taken. Jobbers in either iron, steel, machine tools, supplies, are not stocked up, neither are they buying for stock. There will be a lot of material of almost everything in the above lines needed in this country for a good many months to come.

The approach of May 1 is regarded in this district with some misgivings. The metal-working trades have asked for a conference with the employers, but so far nothing has been done to bring the two parties together. Structural steel workers are also after increases, and May Day strikes may have a considerable following this year.

# Lifting Restrictions on Foreign Commerce

## Trading With Russia Will Probably Be Permitted Soon Without Recognizing the Soviet Government—Relation of Peace Resolution to Trade

WASHINGTON, April 6.—In one way or another action seems likely to be taken before long lifting the last war time restrictions on trading with other nations. It is confidently believed by many persons in close touch with the situation that trading with Russia will be permitted within the next month. While this action will be taken technically by the State Department, the final determination of the policy involved is now in the hands of President Wilson. The President has dictated the policy thus far with reference to relations of the United States with Russia, and is expected to continue to do so regardless of what the recommendations of officials of the State Department may be. It is understood on reliable authority that the State Department has recommended to the President that the ban be lifted on trade with Russia, but that the United States continue to refuse recognition to the Soviet Government.

### The Soviet Government

Problems of far reaching importance involving the Soviet Government have hindered the prompt resumption of trade relations. Officials of the State Department generally view the Soviet Government with distrust, and, regardless of the fact that that Government appears to be firmly entrenched in Russia, are reluctant to establish trade relations. It is not that the State Department officials are especially concerned over the internal affairs of Russia so much as the fear that Bolshevik influence will continue to spread through other countries, and have an increasingly dangerous effect in the United States. Even by permitting the resumption of trade relations without extending official recognition, it is feared that the Soviet Government, by reason of its ability to obtain needed raw materials and manufactured commodities, will increase its strength and prestige. The mere fact that American business men might extend their operations with a financial profit, it is held, would not compensate the United States for a possible spread of Bolshevik influence.

The efforts of an organization recently formed by a number of American exporters for the avowed purpose of forcing the Government to permit trade with Russia have not been well received by officials of either the State Department or the Department of Commerce. Members of this organization make no secret of the fact that they have contracts executed with the Martens' Soviet agency in this country which are good only in the event of ability to get export permits. If the organization did not have this direct financial interest, it would probably be making more headway. Unfortunately for the success of the movement the recognized organizations of business men, such as the Chamber of Commerce of the United States, have shown a disposition to keep hands off. Officials of most of these organizations, while anxious to do everything to extend the foreign trade of American exporters in a legitimate manner, appear to take the view that because of the broader questions involved they will not press the administration at this time to lift trade restrictions with Russia.

### Precarious Business

The agitation on the subject probably will tend to hasten action. The net result, however, when trade restrictions are lifted, will be that State Department officials will not be as much in a mood to extend aid to exporters who may find themselves involved in difficulties as would have otherwise been true. Government officials are firmly of the opinion that those who have contracts with the Soviet Government are in a

precarious business, and that unless they take every precaution they will find themselves a victim of Russian trickery at some stage of the game. When that stage is reached the State Department officials expect that these exporters will come to them and demand protection and assistance because of their American citizenship. In lifting trade restrictions the State Department officials propose that American exporters shall be thoroughly warned that this Government assumes no responsibility, and that they must trade at their own risk.

It is the view of Government officials that the possibilities of trade relations with Russia are not as great as those agitating the subject represent. While Russia has some gold, it is pointed out that a considerable part of it was taken from the Roumanian government, and, in the opinion of some, is more or less tainted. Furthermore, the transportation facilities are extremely bad, and in order to get goods to Russia Americans may find themselves compelled to do something to aid in restoring the railroads in that country. A hint of this situation is given in a communication which has just been received by the Bureau of Foreign and Domestic Commerce. This communication contains information furnished by Victor Kopp, agent of the Soviet Government at Berlin, to officials of the German Government. Mr. Kopp is quoted as saying that difficulty would be found in exporting raw materials in large quantities, and that the aid of American or European purchasers in the way of furnishing locomotives, cars, and spare parts of railroad equipment would be necessary. Mr. Kopp spoke with special reference to the bringing out of Russia of flax, hemp, hides, platinum, gold and silver which are available for exchange for commodities of other countries.

### Will Not Recognize Soviet

While action lifting trade restrictions is likely, the present prospect is that no steps will be taken toward the recognition of the Soviet Government at any time in the immediate future. It seems likely to be a permanent policy of the present administration to refuse recognition.

Confirmation of the belief that the United States Government has no thought of resumption of official relations with the Russian Government is given in the efforts of the Department of Justice to deport Ludwig Martens, who has vainly sought to present his credentials as Ambassador to the United States from the Soviet Government. The Department of Justice has compiled a mass of evidence tending to show that Martens is in reality a German, and that he is a member of the Communist party which advocated the overthrow of the Government of the United States. Hearings on the deportation proceedings instituted by the Department of Justice are being held before the Secretary of Labor, who has authority over deportations.

### Contracts with the Soviets

There is speculation as to just what will be the fate of those holding contracts with the Soviet Government in the event of Martens' deportation. This is one of the complications involving the whole situation.

Secretary of Commerce Alexander, while desirous of doing everything possible to extend trade relations, is awaiting the action of the President and the State Department before taking any steps with reference to the Russian situation. Such queries as come to the Department of Commerce relative to the Russian situation are being referred to the State Department, with request for early information as to plans. It is under-



stood to be the attitude of officials of the Department of Commerce that the prospects for trade with Russia are not as alluring as is represented by those who are urging the lifting of the present ban.

The question of the resumption of trade relations with Russia is also involved in the consideration of a peace resolution in Congress. The joint resolution, as prepared by Republican House leaders, declares the existence of a state of peace, and makes possible the termination of war legislation. Most of the numerous war loans expire either at the date of proclamation of peace by the President, or at a fixed period following such proclamation of peace. Under the House peace resolution the date on which the resolution becomes effective is fixed as the date of the proclamation of peace, and the pivotal date for determining the termination of the various war statutes notwithstanding contrary provisions in the respective laws.

#### The Peace Resolution

Termination of the authority given in the trading-with-the-enemy-act automatically lifts restrictions in trade with Russia. Such action would bring the same

situation as the lifting of the trade restrictions by the President. In neither instance would recognition of the Soviet Government necessarily follow.

The Peace resolution contains a section dealing with trade relations with Germany. Germany is required to accept a state of peace within 45 days, and so notify the President.

In the event of failure of Germany to send this notification, the President is required to proclaim the fact, and declare an economic boycott against Germany. Under such conditions a trade with Germany, or the extension of loans, or other assistance by the United States, or by individuals in the United States, will be prohibited, except under license of the President. A penalty section carrying a fine of \$10,000, or imprisonment for two years, is provided for the enforcement of economic boycott.

Failure of the President and Democrats following his lead to support this resolution may make it impossible to pass it over the President's veto. Every effort will be made by Republicans, however, to leap all hurdles in sight, and bring to an early end the present technical state of war.

O. F. S.

## Influence of Cadmium on the Properties of Brass

No Harm When Percentage Does Not Exceed  
One Per Cent—Effect of Various Percentages

THE influence of cadmium on brass by the well known investigator, Dr. Leon Guillet, is discussed in the December, 1919, issue of *La Revue de Metallurgie*. The work was carried out on two series of alloys, the first with 70 per cent copper and the second 60 per cent. There were also some alloys with about 55 per cent copper. In the first two series the cadmium varied from nothing to 4 per cent. The metals used were electrolytic copper, zinc from Vieille-Montagne which was free from cadmium, and cadmium in small sticks which came from America. The analysis of the alloys obtained are given in Table 1.

Table 1—Analysis of First Series of Alloys

No.	Copper, Per Cent	Zinc, Per Cent	Cadmium, Per Cent	Tin, Per Cent	Lead, Per Cent	Iron, Per Cent
1.....	59.73	40.26	none	traces	traces	0.05
2.....	69.86	29.95	0.17	traces	traces	0.07
3.....	69.69	30.03	0.24	traces	traces	0.08
4.....	69.94	29.40	0.49	traces	traces	0.06
5.....	70.11	29.07	0.74	traces	traces	0.07
6.....	69.83	28.37	1.67	traces	traces	0.08
7.....	70.02	27.91	1.92	traces	traces	0.07
8.....	70.87	27.91	4.11	traces	0.34	traces

Analysis of Second Series of Alloys

1.....	59.73	40.26	none	traces	traces	0.05
2.....	59.51	40.16	0.15	traces	traces	0.10
3.....	60.18	39.25	0.40	traces	traces	0.08
4.....	59.99	39.34	0.54	traces	traces	0.08
5.....	60.18	38.72	1.07	traces	traces	0.08
6.....	60.11	38.15	1.67	traces	traces	0.08
7.....	59.61	38.18	1.97	traces	traces	0.08
8.....	60.05	34.87	4.54	traces	0.42	traces

Analysis of Third Series of Alloys

1.....	55.20	44.75	none	traces	traces	0.02
2.....	55.30	42.38	1.83	traces	0.51	traces
3.....	56.37	39.46	3.64	traces	0.51	traces
4.....	54.14	38.05	7.26	traces	0.49	traces
5.....	55.35	34.95	9.22	traces	0.46	traces

All the mechanical tests were made under the following conditions: On the cast metal, tests taken from four bars cast from a central head. Tensile tests on pieces 13.8 m.m. (0.543 in.) dia. and 100 m.m. (3.94 in.) between punch marks. Shock tests on pieces 10 x 10 m.m. (0.39 in. x 39 in.) with a notch 1 x 1 m.m. round at the bottom broken with a rotating head. Hardness tests with a 10 m.m. ball, and pressure of 1000 kg. While making each tensile test a diagram was taken, but in the majority of cases it was impossible to determine the elastic limit. In regard to contraction of area, this could only be measured in a few cases, at least in the first series of alloys, as the full length of the test piece was deformed and was very irregular

in section. The test results of the first series are given in Table 2.

These tests show that up to 0.74 per cent cadmium no property of the alloy is affected. With 1.67 per cent the tensile strength remains the same but the elongation is decidedly lower. Also the shock test results show a marked decrease. The metal has become brittle. With 1.92 per cent cadmium the tensile strength is very low, the elongation takes a big drop, and the test piece reduces in area locally instead of the whole length of the specimen. The reduction is also quite low, when the cadmium reaches 4.11 per cent, the tensile strength is insignificant and there is no ductility. The shock test result is very low and the alloy is the hardest of the whole series.

The microscopic examination of the series shows

Table 2—Results of Tests of the First Series

Composition			Tensile Test		Shock		Hardness
Number	Copper	Zinc	Cadmium	Per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent	Number
1	69.90	30.07	..	28150	49	..	17.0 double 5.30 47
2	69.80	29.95	0.17	30580	63	..	16.8 double 5.40 45
3	69.69	30.03	0.24	30580	57	..	17.5 double 5.35 46
4	69.94	29.40	0.49	28300	45	..	16.8 double 5.40 45
5	70.11	29.07	0.74	29010	47	..	18.0 double 5.20 48
6	69.83	28.37	1.67	27310	33	..	6.3 128° 4.95 54
7	70.02	27.91	1.92	13510	7	14.2	6.3 125 5.15 50
8	70.87	27.91	4.11	5120	..	..	1.9 .. 4.65 61

that up to 0.74 per cent cadmium the structure is the normal one of brass. With 1.67 per cent the polished section shows some trace of free cadmium, and this constituent increases as the percentage rises. It would seem then that cadmium only enters feebly into solid solution in the alpha constituent of yellow brass, and when the percentage increases beyond this amount it is found as free cadmium in the alloy. When this free cadmium is present the tensile properties decrease, particularly the elongation and resistance to shock. The test results of the second series are given in Table 3, made under the same conditions as those for the first series.

Up to 0.54 per cent cadmium the mechanical properties are not changed. With 1.7 per cent there is noticed a slight lowering in the elongation and reduction, and

an increase in brittleness. With increasing cadmium the ductility and resistance to shock steadily decrease. The hardness is only slightly changed by the presence

### Application of Heat Treatment to Non-Ferrous Alloys

Very little attention seems to have been paid to the possibilities of the heat treatment of non-ferrous metals and alloys. The subject is now receiving some notice. A paper, "The Extension of Heat Treatment Processes to the Non-Ferrous Alloys," was presented recently before the Birmingham Metallurgical Society (England) by Dr. F. C. Thompson, Sheffield University. The author, according to an abstract in the *London Iron and Coal Trades Review*, said that leaving aside heat treatments of the nature of annealings after cold work, there was evidence that on the Continent and to a slight extent in America heat treatment analogous to that applied to steel was being applied to non-ferrous alloys, the Ruber bronze being a case in point. In Great Britain, so far as he was aware, little or nothing had been done. Not all alloys were susceptible to such treatment. Quenching of any of the cupro-nickel alloys could not produce any variation in the constitution, though it might result in the setting up internal stresses which might produce appreciable effects upon the mechanical properties.

In most alloys of two metals, such as the brasses, the complete solubility in all properties in the solid state found with copper and nickel did not hold. The 70-30 brass was a typical example possessing a micrographically identical structure, both when hot and when cold. Such a brass, therefore, was not structurally affected by quenching and offered little or no scope for heat treatment. In Muntz metal, however, with 40 per cent of zinc, the saturation limit of the alpha solution had been passed, and a new constituent, the beta solution, richer in zinc, had made its appearance. At higher temperatures—800 deg. C.—a 60-40 brass no longer consisted of these two solutions, the alpha gradually dissolving in the beta and finally disappearing entirely. In such an alloy, therefore, they had conditions not dissimilar from those obtained in a steel, and by quenching 60-40 brass from 800 deg. C. it was possible to retain at ordinary temperature, again more or less completely, a structure normally stable only at a red heat. Quenching of Muntz metal from 830 deg. C. had resulted in an increase of the yield point of 29 per cent and of the maximum stress of 12 per cent, while the elongation and reduction of area had fallen 41 and 33 per cent respectively. No very marked improvement was thus effected, but for certain purposes the increase of strength might be of distinct value. When 60-40 brass was quenched to give an all-beta structure, and subsequently tempered, the tensile properties appeared to revert more or less to the normal. Since, however, the alpha was precipitated in finer particles than those found in the normal condition, a closer structure could be obtained which possessed distinctly greater resistance to shock.

A suggestion worthy of trial was that if a rod of the same material, before being cold rolled or drawn, was quenched from about 780 deg. C., it might be possible to draw it considerably further than was customary. The mechanical effects of quenching on the bronzes had been investigated by Guillet, and from his figures certain conclusions could be drawn. Alloys with less than 8 per cent of tin were hardened slightly by quenching from temperatures of 400 to 600 deg. C., and elongation was raised quite appreciably. Since in such a bronze no structural change resulted from the quenching, the improvement must be ascribed to the internal stresses. With more than 8 per cent of tin the maximum stress and the elongation were both raised when the quenching temperature was raised to about 500 deg. C.

Of all the non-ferrous alloys the copper aluminum alloys offered the greatest scope for heat treatment, and on these most experimental work had been carried out. There were many non-ferrous alloys in which the possibilities were as great as in the steel. Britannia metal, for instance, could be considerably hardened by quenching it from temperatures just below the melting point. Rapid cooling hardened the white metal, and there was undoubtedly a critical point in the nickel silvers at about 300 deg. C., which rendered these alloys capable of modification according to the rate of cooling.

Table 3—Results of Tests of the Second Series

Composition				Tensile Test			Shock		Hardness	
Number	Copper	Zinc	Cadmium	Yield, Lb. Per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent	Number	Angle	Diameter	Number
59.73	40.26			49026	40	42.39	12.5	115°	4.25	75
59.51	40.16	0.15		48072	38	37.75	12.8	120	4.15	78
60.18	39.25	0.40		47646	48	49.75	13.1	115	4.20	77
59.99	39.34	0.54		48784	39	48.6	15.6	105	4.10	80
60.18	38.72	1.07		48784	32	31.9	9.4	135	4.10	80
60.11	38.15	1.67		48358	28	31.3	5.9	150	4.00	84
59.61	38.18	1.97		47646	19	18.2	4.3	165	3.90	89
60.05	34.87	4.54		34277	9	7.3	3.1	175	3.85	92

of cadmium, but increases a little when the cadmium passes 1 per cent. Microscopic examination of these different alloys confirms the previous correspondence between the presence of free cadmium and decrease in the value of the different mechanical properties. The results on the third series are given in Table 4.

In this series, as in the others, the tensile strength does not diminish until the cadmium percentage is very high. Even with 3.6 per cent cadmium the tensile is

Table 4—Results of Tests of the Third Series

Composition				Tensile Test			Shock		Hardness	
Number	Copper	Zinc	Cadmium	Yield, Lb. Per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent	Number	Angle	Diameter	Number
1	55.20	44.75		55469	20.0	30.7	13.1	132°	3.25	130
2	55.30	42.38	1.83	45655	20.0	12.8	3.1	172°	3.25	130
3	56.37	39.46	3.64	45797	6.5	8.3	2.8	175	3.45	115
4	54.14	38.05	7.26	19058	0.5	1.4	1.3	178	3.30	126
5	55.35	34.95	9.22	17209	0.5	1.4	1.3	178	3.20	135

45,797 lb. per sq. in. On the other hand the ductility and brittleness are affected very quickly. Free cadmium is found in all these alloys in fine filaments or more rarely in larger deposits.

The general conclusions drawn are that 1 per cent of cadmium need not be feared in regard to mechanical properties in 70 per cent and 60 per cent copper alloys. The first effect of cadmium is seen in the lessened resistance to shock. With a higher percentage the elongation suffers and speedily becomes very low. These changes in the mechanical properties correspond to the appearance of free cadmium, which is isolated in filaments that have a tendency to surround the crystals of metal. When the cadmium is very high the cadmium forms spherical agglomerations similar to those shown by lead in brass. It would seem that makers and users of brass have nothing to fear from cadmium when the percentage does not exceed 1 per cent, which percentage is never reached in industrial alloys. G. B. W.

A new publication of the Bureau of Standards, Scientific Paper No. 361, "Magnetic Testing of Straight Rods in Intense Fields," discusses previous experiments on high inductions and describes a method which is suitable for measuring the magnetic properties of fairly long rods of ferromagnetic materials, when magnetized in intense fields. Normal induction data are compared with those obtained by the Burrows method and found to agree satisfactorily within the range of the latter. From the normal induction data, the intensity of magnetization and reluctivity are calculated and discussed.

Receivers of the Pittsburgh Railways Co. have petitioned the courts at Pittsburgh for permission to purchase 150 new passenger cars and other equipment at an estimated cost of \$2,000,000.

## SHIPPING PROBLEMS

### Immense Tonnage to Be Moved in Valley—Labor Questions Are Serious

YOUNGSTOWN, OHIO, April 6.—Though blast furnace and finishing mill schedules more closely approximate normal than at any time this year, the problem of shipping output is a staggering one, toward the solution of which traffic departments of both producers and carriers are concentrating energies. Accumulation of finished product in the Mahoning Valley mounted to between 125,000 and 140,000 tons last week.

The Carnegie Steel Co. reported the heaviest accumulation at any time during the past six months, 22,500 tons of finished steel being "on the ground," at its district plants, awaiting shipment. Not only is a vast amount of capital tied up in this manner, but consumers are clamoring for material purchased months ago and held up by car shortage. This condition is being emphasized in the sales policies of the independents, which are slow to make commitments.

#### Negro Labor Unsatisfactory

Usual spring restiveness of labor is making itself apparent. Because of inability to assemble crews, sheet production is being held back. Common labor is scarce despite the fact that the industries are paying higher wages than ever before. Many laborers prefer to work in the open during the warm months of the year and are deserting the mills to hire with contractors, who are offering higher wages than the mill scale. This is particularly true of colored labor, for the negro cannot resist the call of open weather. Since the war, negroes have been imported in large numbers from the South to take the places of foreigners who returned to their homes in Europe. As a rule, these negroes are unsatisfactory and indifferent workmen and the labor problem is becoming an increasingly pressing one. Many of the foreigners will never return to America, having accumulated enough money in this country to live comfortably in Europe the rest of their lives. For instance, a foreign-born worker in a district plant recently departed for Europe, withdrawing his savings from a local depository, which had mounted to \$22,000. Savings accounts of \$8,000 and \$10,000 in the names of foreigners employed in the mills are common.

#### Heavy Cars Required

Railroad traffic heads state that 3000 cars are required to ship piled steel from the Valley. Embargoes on eastbound shipments are holding up much material, as well as car scarcity. A careful survey of unmoved steel shows that the tonnage of product manufactured, but not delivered, has substantially mounted in the past 10 days.

All four of the East Youngstown stacks of the Youngstown Sheet & Tube Co. are active and it was planned to blow in one of the idle Hubbard smelters early in the week. Four batteries of six by-product coke ovens, consisting of 51 units each, are in commission. Finishing schedules are being well sustained, on the whole, in all plants, though orders are still far ahead of production.

Soaking pit employees of the Republic Iron & Steel Co. have been put on an 8-hr. basis.

Blast furnace No. 4 of the Carnegie Steel Co. at Sharon, Pa., resumed March 31 after a four months shutdown. The top of the stack was damaged the last of November, 1919, by a slip, and was relined. It was ready for resumption Dec. 25, but coke dearth has forced it to remain inactive.

Sharon works of the American Sheet & Tin Plate Co. and the American Steel & Wire Co. are operating on a more normal basis.

#### Buyers Visit Mills

Urgent buyers are visiting the mills, on the lookout for any excess rollings which may be had for immediate delivery. Representatives of regular customers

are also making regular trips to the Valley, to keep in touch with production and with their allotments. Buyers continue to exercise more restraint than formerly and the mills are not disposed to make commitments in view of their sold-up condition and irregular traffic conditions. In small lots, one-pass black sheets have been sold recently for 10c.

Automobile makers are seeking, in some instances, to place contracts for cold-rolled strip steel for fourth quarter delivery, and are willing to book for 1921 shipment.

Mills in this district are sold ahead four and five months. On all business booked now for delivery six months ahead, price is to be determined by the market at that time. The leading strip steel maker is making large additions to capacity, which will be ready for production this year.

March shipments of semi-finished material were much better than chaotic traffic conditions indicated, but were much below normal. Makers of sheet bars, both grades, and billets are out of the market for the first half.

In the Mahoning Valley, industrial concerns have been given assurance by the banks that if they desire to store coal during the summer against expected shortage next winter, they will be accorded full financial assistance.

Financing of coal storage operations has been recommended to the Federal Reserve Board by the Council of National Defense. "The move to put the mines in full operation at this time is a good thing," states the president of a large producer. "It will do away with idleness in the mining districts, where the men have been compelled to remain idle probably half their time by the lack of cars."

Valley steel companies use about 25,000 tons of coal a day, or 700,000 tons a month. A guaranteed winter supply of coal stored during the summer as iron ore is stored would therefore run to about 2,000,000 tons. This fuel, according to present indications, would cost well above \$3 per ton. While bituminous coal has not been stored previously in this territory in heavy tonnages, the practice is common at the head of the Lakes.

### Safety Congress Will Meet in Milwaukee

Milwaukee was selected as the seat of the ninth annual congress of the National Safety Council of America at a conference between officials of the organization and the Milwaukee Association of Commerce on March 27. The dates of the meeting were fixed upon Sept. 27 to Oct. 1, 1920. The National Safety Council was founded in 1913 with 40 members, including a number of leading employers in the metal trades and founders' industries of Milwaukee. The membership now embraces more than 15,000 factories and workshops, railroad, insurance companies, technical schools, governmental agencies and other organizations employing an aggregate of more than 6,000,000 workers. Charles W. Price, formerly safety engineer Industrial Commission of Wisconsin, is general manager. Arrangements for the Milwaukee congress are in charge of the committee on safety and sanitation of the Milwaukee Association of Commerce. Richard P. Tell, president and general manager National Brake & Electric Co., Milwaukee, is chairman; Walter C. Lindemann, vice-president A. J. Lindemann & Hoverson Co., is vice-chairman.

### Earnings of the Steel Co. of Canada

Forecasts of an excellent year's showing in 1919 by the Steel Co. of Canada, Ltd., Hamilton, are borne out in the annual statement of the company. Gross profits for the year ended Dec. 31 last are shown in the exhibit at \$4,000,940, as compared with \$5,367,120 in 1918. After all deductions, there remained for application to the common stock of the company a balance of \$1,927,430 last year, as compared with \$1,975,017 in 1918. The showing in this respect was equivalent to 16.76 per cent on the \$11,500,000 common stock of the company outstanding, as compared with 17.18 per cent a year ago and 19.84 per cent in 1917.



## FORD INVESTMENT PLAN

### Employees Encouraged to Be Thrifty by Investing in Stock

The Ford Motor Co., Detroit, recently established an investment plan for its employees under which its workers are encouraged to be thrifty by being permitted to invest a portion of their income in certificates issued by the company and bearing a guaranteed rate of 6 per cent interest. An increase of the rate above 6 per cent will be made semi-annually if the earnings of the company permit, the additional rate being fixed by the board of directors. The certificates are issued in the names of employees in denominations of \$100, \$500 and \$1000 and are non-negotiable and non-assignable. Only persons in actual service of the company are permitted to buy or hold the certificates.

Employees are permitted to make deposits up to one-third of their pay toward the purchase of certificates. These deposits may be made within three days after the pay has been received. In addition to using one-third of their pay in buying certificates, employees may also use for this purpose, the entire amount of bonuses received, provided the bonus money is deposited within five days after receipt. Deposits made toward the payment of certificates draw interest at the rate of 3 per cent per annum, compounded semi-annually. The rules specifically provide that in no case will money withdrawn by an employee from a bank account be accepted in payment, either in whole or in part, for an investment certificate, as these certificates must be paid for entirely out of pay and bonus.

The company reserves the right to require 30 days' notice in writing of an intention of an employee to demand payment of certificates. Subject to this reservation an employee may, at any time, turn in his certificates and secure the full face value for them together with interest due thereon at the rate of 6 per cent per annum. In case of the death of an employee, the certificates become payable at once to his personal representative, in cash plus accrued interest. However, certificates standing in the name of a deceased employee may, at the discretion of the directors of the company, be held as an investment and draw the regular interest and additional payments for the benefit of his dependents. The directors reserve the right to redeem the investment certificates for cash at any time and also the right to issue in place of the certificates another form of security more advantageous to the employee, or to convert outstanding certificates in a similar manner. In any event, however, the employee retains the option to receive cash for any sums paid by him on certificates.

The investment plan is an extension to the company's general policy of allowing its employees to participate in its prosperity, which resulted in the adoption of its profit-sharing plan in 1914 and, in addition, a cash bonus plan that was placed in effect Jan. 1.

### In the Field of Labor

The Springfield, Mass., Lodge No. 214, International Association of Machinists, with a membership of 2500, or less than 50 per cent of the qualified machinists in that city, is to try to stabilize the trade by the establishment of a minimum wage scale. The effort will not be made, however, until after a membership drive in April. Under the proposed plan, toolmakers, who now receive a minimum of 60c. per hour, are to receive a minimum of 90c.; machinists, who receive 60c. to 75c. per hour, will get 80c.; specialists, now receiving 50c. to 60c. per hour, will have 70c., while machinists' helpers will be raised from 40c. to 55c., to 60c. per hour. Specialists' piece work will be undisturbed. Armory lodge of machinists, whose wage scale comes under Government jurisdiction, and the lodge of railroad machinists have nothing to do with the new proposal.

The Massachusetts Board of Arbitration and Conciliation has offered its services in an effort to effect a

settlement of a wage dispute existing at the plant of the Bay State Foundry Co., Westfield, Mass., where employees are on strike. The board has not been called upon to act, however.

In carrying out its housing plan, the Inland Steel Co., has let its first contract to the W. Adams Co., Chicago, for 200 houses at Indiana Harbor, Ind. The housing corporation is capitalized at \$2,000,000. The houses will be sold to the company's employees at cost. Part of the addition set aside for the community has been reserved for a park.

The Louisville Cement Co., which has a large plant at Speed, Ind., sometime ago established a community building there, with a frontage of 160 feet. It has been so successful that an enlargement is planned. The company provides the buildings, pays all expenses and permits a committee of employees to manage the institution, making nominal charges in certain cases, such as 5c. for the movies and 2c. a cue for billiards and pool. The money may be used in any way desired by the committee for the benefit of the place. The company is building several houses near the community center and is paying half the cost of a consolidated school building.

Legislation for the creation of an industrial court to settle controversies between employers and employees in any business or vocation will be possible in Nebraska if a constitutional provision is adopted by the voters in a special election on Sept. 21. The proposed court would also have power to enforce laws against "unfair business practices and unconscionable gains affecting the public welfare." Appeal to the State Supreme Court from the commission's final orders is provided.

Employees of the International Harvester Co., Chicago, have purchased 15,000 suits of clothing from the British Government. The suits are a surplus of a supply manufactured for Great Britain's demobilized soldiers. The price per suit will be about \$18 and the Harvester company will advance the cost, about \$250,000, reimbursing itself through deductions from the wages of employees.

The Indiana Homes Co., a subsidiary of the Inland Steel Co., Indiana Harbor, Ind., has let contracts for the construction of 200 houses to be sold at cost to employees. The site is near Washington Park and One Hundred Forty-fifth Street. A total of 2000 buildings is said to be contemplated. The first group of houses will be ready next fall after underground and surface improvements have been completed.

Employees of the American Bridge Co., Ambridge, Pa., and also of other manufacturing plants in that district, are trying to combat the high cost of living by forming cooperative clubs to buy food and supplies of other kinds in quantities, thus securing lowest prices possible.

Foundries in the Pittsburgh district that operate on the closed shop plan are now paying molders on the basis of 93½c. per hour for an 8-hr. day or \$7.50 per 8-hr. day, with double time for Sunday and holidays. Among the prominent foundries in the Pittsburgh district that operate the closed shop are the Pittsburgh Valve, Foundry & Construction Co., Stroh Steel Hardening Process Co., Edgewater Steel Co. and the Springfield Foundry Co.

An analysis of the initial operation of the savings bank thrift plan of the Worcester, Mass., works of the American Steel & Wire Co. shows that 1312 out of the 6500 workers have availed themselves of the opportunity, representing an annual saving of \$262,233. The average sum per worker subtracted from the weekly wage and deposited for the employee in a savings bank is \$3.99. At the North works, where the office is situated, 454 employees will save an average of \$4.15 a week; at the larger South works 774 employees will average \$4 a week, and at the small Central works 84 employees will average \$3.01.

## Power Hammer for Pulverizing Pig Iron Samples

A Fairbanks power hammer equipped with pulverizer and designed for use in chemical laboratories for pulverizing pig iron samples for analytic purposes is a recent product of the United Hammer Co., Oliver Building, Boston. The hammer is explained as a time and labor saving device which will reduce  $\frac{1}{2}$ -in. to  $\frac{3}{4}$ -in. cubes in 2 to 3 min. so that particles are fine enough to pass through an 80 mesh sieve. In addition

to these savings it is pointed out that a more uniform result is obtained than by the ordinary hand methods.

The machine is built in two types, belt-driven and arranged for motor-drive in one size only, having a 100 lb. weight of ram with 2-in. mortar and pestle. It is operated by a foot treadle at the base of the machine, or by a special starting device as shown in the accompanying illustration. The hammer is rated to strike an approximate blow of 600 lb. when running at 300 r.p.m.

It is emphasized that the hammer is built especially for this work, having a steel anvil instead of the ordinary cast-iron anvil, the working parts forgings, a special grade

of steel for the mortar and pestle, and the upper die of die steel.



Power Hammer Rated to Reduce Pig Iron Samples of  $\frac{1}{2}$ -In. to  $\frac{3}{4}$ -In. Cubes in 2 to 3 Min. So That They Will Pass Through an 80-Mesh Sieve

## Causes of Economic Troubles

"If people would study and criticise themselves more and their Government less, we would get along faster out of our economic difficulties," A. E. Adams, president of the First National Bank and Dollar Savings & Trust Co. and director of the Youngstown Sheet & Tube Co., at Youngstown, Ohio, told members of the Youngstown District Engineers' Club, at their monthly meeting March 30.

"Unless some very vigorous measures are taken to correct existing misunderstandings in this country, such as in the matter of profiteering, complaints against which are groundless in 99 cases out of a hundred, we will suffer a business depression. It is the duty of the Government to quit catering to what the people want," continued Mr. Adams.

"Prices cannot decline sharply except through business depressions, and then not for long, because these are governed by the amount of credits outstanding. Individual business concerns will aid in the return to normal by liquidating their debts, but not until governments start to liquidate in a big way, will the movement to world deflation really begin.

"The world has not yet recovered from war hysteria. During the war we were all subjected to an emotional tensility. The armistice meant an emotional rebound. We relaxed, swinging away from all restraint and discipline. Everyone wanted to have a good time. Those who had been toiling unremittingly during the strain of the war period felt that they deserved a vacation. The strikes of last fall were not based on reason; pure emotional reaction was behind them. We thus lost a sense of duty and obligation that works inevitably toward poverty and increased cost of living."

Mr. Adams said that one cause for our present state of mind is the automobile. "Within a very few years," he said, "the motor car industry has directed from other industrial channels 10 per cent of the productive energy of the nation. You cannot take away productive energy from the channels of industrial necessities

and divert it into the production of what might be termed 'luxuries,' without feeling the effects of it economically."

## Public Representation in Wage Adjustment

WASHINGTON, April 6.—An early opportunity will be offered for a test of the wage adjustment plan of the new transportation act, under which the public is given equal representation with the carriers and employees on an arbitration board. Reference of the pending railway wage disputes to the new Railroad Labor Board has come sooner than was expected, although it was believed that such action would be taken before long.

Many persons who have been following the controversy have welcomed the split between the committee and the carriers and employees which occurred during the past week.

The railway unions have all the time been averse to settlement of their differences before a board on which the public has representation, and have been anxious that they should reach an agreement at joint conferences with the carriers. E. T. Whiter, chairman of the Railway Executives' Conference Committee, in announcing that his committee would not continue the conference longer, said that the railroads could not assume responsibility of adding a billion dollars to the costs of transportation, which must necessarily be borne by the public, without the full knowledge and consent of the public.

The labor union chiefs expressed regret at the action, and insisted that the carriers should have made more of an effort to reach a settlement without reference to the tripartite board.

President Wilson is expected to announce the appointment of members of the new Railroad Labor Board in the near future. Under the new transportation act, he must submit nominations to the Senate for three members representing the carriers, three representing employees, and three representing the public.

Names have already been submitted to him by carriers and employees, from whom he must make his selections. The President is not restricted as to the selection of the representatives of the public.

## Daily Pay Day at Burroughs Plant

The Burroughs Adding Machine Co., Detroit, has adopted a daily pay day plan to avoid the congestions that took place at its pay stations every Saturday, and which had become more pronounced with the large expansion of the plant and the increased number of workmen. Under the plan the piece and hourly employees of certain departments are paid on one night and other departments on other nights during the five full working days of the week. The employees line up according to their departments and clock numbers as they did under the old plan and all are paid in six or seven minutes as compared with thirty minutes, the time that some men were compelled to stand in line under the old plan.

Four portable pay stations have been erected and are moved to locations where they are most convenient to the departments that are being paid. The men are paid when they quit work at 5 p. m., so that at quitting time Saturday noon they can leave for their homes without delay. Night workers can fall in line with the day men at 5 p. m. or get their pay up to 5:30 p. m. on their regular nights before starting to work. Salaries are paid on Saturday as heretofore. One advantage of the new plan is that only six days' pay is kept back to give the paymaster's department time to make up the pay rolls. Under the old plan eight days' pay was held back.

Plans are being made by the Government to enlarge the facilities at Camp Holabird, Baltimore. About 30 acres of land have been acquired adjoining the present camp and it is announced that additional machine shops will be constructed. One of the largest automobile repair shops in the country is maintained at the camp.



### Lorraine Steel Works in French Hands

(Continued from page 1024)

support to France during the period which must elapse before the French works can attain their normal production.

#### France's Future in Steel—Selling Comptoirs

Everything points to a brilliant future for the French iron and steel industry as a result of the acquisition of Lorraine. During his recent visit to the United States as head of the French Economic Mission, M. Schnieder, director of the important Creusot works, took occasion to lay stress on this fact and his confidence in the great rôle which France will play along this line is reflected by other French leaders in the industry. The significance of the conspicuous part they must assume in the rehabilitation of French industry is clearly apparent, and the tendency is toward greater collaboration and closer amalgamation of the iron and steel interests.

The products of the Lorraine region have until recently been sold by large comptoirs, or selling companies, in Paris, the foundry pig iron being handled by the Groupement des Fondateurs Sinistrés, and the partly finished and finished products in steel by the Groupement des Sinistrés du Nord et de l'Est. These selling companies are composed of members whose plants in the North and East of France were destroyed or damaged as a result of the German invasion, to whom the Government has, as a measure of compensation for their losses, given permission to handle the output of the former German works in Lorraine. Inasmuch as the work of liquidating these properties has now been completed and their control turned over to the purchasing companies, the above groupements have ceased taking orders and have themselves entered into liquidation. Future orders for export of iron and steel from the Lorraine plants will be handled, according to the class of products, by the Comptoir des Fontes Hematites, 7 rue de Berry; the Comptoir Siderurgique de France, 164 Faubourg St.-Honore; or the Comptoir des Toles et Larges-Plats, 19 rue de Balzac, all of Paris. These three organizations comprise practically all the most important French heavy metallurgical plants, controlling the great bulk of iron and steel exports from France.

#### German Iron and Steel Production

It has been a subject of comment that for some time no statistics have appeared of the German iron and steel output which were resumed monthly soon after the armistice. The following from the London *Ironmonger* of March 13 is of interest in this connection:

The last monthly statistics of iron and steel production in Germany were published by the Association of German Iron and Steel Manufacturers in November of last year. They give the figures for the month of October, 1919. Since that time no further statistics have appeared. There is much speculation as to the reasons for the suppression of the information. Some ascribe it to the fear of giving the workmen an opportunity of calculating the profits on the basis of the production figures, which might induce them to put forth new claims; others think that the object is to prevent home consumers from starting an agitation against the insufficiency of their supplies, on the ground that the difference between the output and the delivery figures show that exports are excessive. Finally, it is thought that the manufacturers, in their efforts to fight the government's plans for controlling and regulating the iron industry, are trying to keep back all the information possible. At any rate, the production since last autumn can only be guessed at. Labor conditions are more settled, strikes have been less frequent, but the iron industry is suffering acutely from lack of coal, so that there has probably been a decline of output, although perhaps not considerable. The German Steel Works Union has been prolonged for a further two months, a measure which cannot have much effect, because some of the most important works have for a long time past considered themselves as free from the union. The government's proposal to set up self-governing bodies for the iron and other industries is meeting with violent opposition by the manufacturers.

### Harvard Engineering School Inaugurates Industrial Co-operation

Co-operation with industries will be added to the curriculum of the Harvard Engineering School beginning June of this year. This is the plan that has been successfully carried out by the University of Cincinnati under Dean Schneider and the University of Pittsburgh under Dean Bishop. Although in the past large numbers of engineering students have found employment in industry during summer vacations, the work has seldom been adapted to the special needs of the student and was not supervised. Under the new program, the first two years of the course will be substantially the same as in other schools. The combined engineering study and work in industry will begin with the sophomore year and continue until the senior year. During these 16 months, the class, divided into two sections, will alternate between study and industrial experience in two-month periods with one vacation, which may be used by the student for further industrial work. Thus, in the regular courses there will be eight months of study and six months of practical experience, or if the student so elects, eight months of each.

The industrial co-operation will be under the supervision of a director, who will arrange to place each student in a place to gain proper experience. These student workers will receive the same rate of pay as the regular workmen doing similar work and will be treated as the other employees, except that the director will have access to them to arrange the character of their work and meet small groups to discuss their problems. Each student will be questioned as to the type of work he is doing, the processes he is carrying out and the whole system of management of the factory and other technical details that he may have opportunity to observe. Although the plan is optional, it is expected that it will be selected by practically all students of the engineering school and probably by graduates in arts and sciences who enter engineering in the third year.

#### Little Merchant Iron Being Made in the Valley

The Youngstown Sheet & Tube Co., Youngstown, Ohio, announces the installation of a pig casting machine at its Hubbard, Trumbull county blast furnaces, which will mark the end of casting on the floor at the Hubbard plant. Pig casting machines are in general operation in the district. In the Mahoning Valley at present, pig iron output for the market is at a low ebb, except by merchant stacks, for in nearly all plants the hot metal is going in ladle cars directly from the stacks to conversion departments. As production of hot metal is below requirements of finishing mills, comparatively little pig is being cast by the steel companies.

It is understood, however, that the Republic Iron & Steel Co. intends to put two of its stacks on a merchant production basis, turning out basic pig iron for sale in the open market.

The 500-ton stack of the Struthers Furnace Co., Cleveland, is the only strictly merchant furnace in the Valley.

An order has been placed for ship plates in Canada by the British firm of Armstrong-Whitworth. The original quantity wanted by the English shipbuilding concern was 20,000 tons, but it was found impossible to supply the entire amount from the Sydney, N. S., mill of the Dominion Steel Corporation, on account of the pressure of other business, notably the plates being supplied under contract for the Canadian Government, which amounts to 50,000 tons per year and will be increased to 75,000 tons. The mill at Sydney has a capacity of 100,000 tons of plates per year.

John R. Hogan, 237 North Sixth Street, Philadelphia, iron and steel merchant, has filed plans for a two-story warehouse, 150 x 365 ft., at Madison and Cedar streets. The estimated cost is \$163,000.



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# THE IRON AGE

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## Preparing to Store Coal

The action being taken by the leading steel companies toward assisting in storing coal, and in this way contributing toward the stabilizing of the coal industry, as suggested by the majority members of the President's coal commission, is highly encouraging. It is pointed out in our Youngstown correspondence this week that one company, on account of its large supply of coal, has been able during the past six months to operate much more regularly than other companies; and this company intends to follow the policy of storing coal to a larger extent, while other producers of steel are preparing to have on hand much greater tonnages than in past years. The banks also are offering a helping hand and it seems likely that all practical difficulties will be overcome.

If this policy of storing coal during the summer is generally followed, the miners will be able to work with greater regularity. No one can doubt the justice of their complaint that they are compelled to be idle too large a part of the year, and the morale of the working force will be better if the work is distributed throughout the year, even if the total income of the workers is not much increased. In order, however, to insure the success of the movement, it will be necessary, as was suggested in these columns last week, to influence public officials and the public in general to do their part in buying and storing coal during the summer. Co-operation must be had all along the line to bring about the desired result.

The coal and coke situation is more encouraging than it has been for a long time. The Alabama miners have already assented to the proposed wage agreement and there seems to be little danger that miners in other parts of the country will raise any serious objection to it. It is true, however, that there are a few local troubles with miners in Illinois and elsewhere, and the latest news from Kansas indicates that the dissatisfaction of miners in that State will test the ability of the new Kansas Court of Industrial Relations to function satisfactorily.

As to coke, the only important question pending is in regard to the price, and while an advance has already taken place and further ad-

vance is predicted in some quarters, it is hoped that a conservative policy will prevail, so as not to increase unduly the cost of making pig iron or to invite further Government interference. Some of the coke operators feel that they have been restricted more than the manufacturers of iron and steel products, and that now it is their time to make liberal profits; but they will injure themselves in the long run by advancing prices to unjustified levels.

## Steel Production in 1919

On the basis of the official pig iron production statistics recently returned it seems probable that the production of steel ingots and castings in 1919 was a trifle over 34,000,000 gross tons, or somewhat more than has been assumed by those who used old factors in estimating steel production from pig iron production.

There have been two departures from old relations between pig iron and steel. One departure is the failure of foundry pig iron production to increase in proportion to the total pig iron production, while the other is that the proportion of scrap used in basic open-hearth steel manufacture has increased. As to the relation between foundry pig iron and total pig iron, or, practically speaking, the relation between foundry iron and steel making iron, a simple illustration is that production of foundry pig iron was 5,220,343 tons in 1913 and 5,145,260 tons in 1918, showing an actual decrease, while the total production of pig iron increased from 30,966,152 tons in 1913 to 39,054,644 tons in 1918, or by 26 per cent. One might attribute that departure to the war, which called for steel products much more than for iron castings, but 1919 did not right matters, since in that year the production of foundry iron was 6 per cent less than it would have been if the proportion shown in 1913 had obtained. One can go back farther than 1913, in fact, and find that for quite a while the proportion of foundry pig iron to total pig iron has been decreasing. Proper comparison can only be made, of course, by taking account of malleable iron also.

As to the relation between basic pig iron and basic steel, the steel exceeded the pig iron by 62.0

per cent in 1913, but by 74.2 per cent in 1918. The reciprocals, or the proportion of pig iron to steel, were 61.7 per cent for 1913 and 57.5 per cent for 1918. Practice, of course, was not uniform at the various steel works, some works using direct furnace metal with relatively little scrap, and others cold pig with large scrap percentages. The main point is that an unusual proportion of scrap was used in 1918, taking the industry as a whole. How this may be in the future remains to be seen, but it seems safe to conclude that substantially as large proportions of scrap were used in 1919 as in 1918. The difference in basic steel production in 1919, according to whether the 1913 or the 1918 proportion with pig iron obtained, would be about 1,800,000 tons.

The 1919 production of Bessemer and low-phosphorus pig iron was 9,975,934 tons. In 1918 the total production of Bessemer and of acid open-hearth steel ingots and castings was 87.4 per cent of the production of Bessemer and low-phosphorus pig iron. Applying the same ratio to the 1919 pig iron production, the output of Bessemer and of acid open-hearth steel last year appears to have been about 8,700,000 tons.

The 1919 production of basic pig iron was 14,494,131 tons, and applying to this the ratio that obtained in 1918 the output of basic open-hearth steel ingots and castings would appear to have been about 25,200,000 tons. Allowing 350,000 tons of other descriptions of steel, the total output of steel ingots and castings in 1919 would seem to have been about 34,250,000 tons. If the production of basic steel had been in the lower proportion obtaining in 1913 the total steel would be only about 32,500,000 tons. This, however, is quite improbable.

Whatever may have been the precise relations between pig iron production and steel production in 1919, it is evident that the Steel Corporation's output of steel was a much larger proportion of the country's total production than in the previous year. The corporation's production of steel ingots decreased by only 12 per cent from 1918 to 1919. If the whole country's production had decreased only by that amount the 1919 production would have been 38,000,000 tons of steel ingots and castings, which of course it was not.

If the production of steel ingots and castings in 1919 was in the neighborhood of 34,250,000 tons, as computed above by using the 1918 ratios between pig iron and steel, the Steel Corporation's proportion of the total output would be precisely one-half its production, all in ingots, being 17,200,373 tons. The annual report just issued gives the operation in 1919 in general as 74.5 per cent of capacity, from which it may be taken that the corporation estimates its ingot capacity at about 23,000,000 tons. It is probable, however, that the corporation is taking a conservative view of its capacity and awaiting actual test under good operating conditions to show what the plant facilities really can accomplish.

Structural steel has been an important factor in the post-war export trade. While the total of

these exports in 1919 was not as large as in 1913, it was naturally quite in excess of the movement in war time. The 360,780 tons of last year compares with 403,260 tons in 1913 and with 294,150 tons in 1917. Noteworthy features of these exports have been the increased consumption by France and Japan and the falling off in shipments to Canada. In 1919 France was credited with 79,660 tons against almost none before the war and small quantities in war time. Canada in 1913 took 275,180 tons of structural steel from this country, but only 99,000 tons in 1919. In 1913 only 8980 tons was sent to Japan, but in 1919 the total rose to 49,920 tons and the January, 1920, shipments were at the rate of 100,000 tons per year. China, which took only 2100 tons in 1917, is credited with 6030 tons of the 1919 exports, while shipments to the Philippine Islands were 5060 tons last year, against only 1020 tons in 1917.

### The Role of Chromium

Of the major alloying metals, which in recent years have become necessary to metallurgical and engineering progress, chromium plays the most important role. This is true not only in steel-making but also in the manufacture of other alloys. The importance of chromium has been greatly enhanced as a result of the war.

In the previous years the use of chromium in the steel industry was largely confined to the regular chrome-nickel and chrome-vanadium steels and similar combinations. It also figured as a simple alloying element in forgings and particularly castings, in addition to its use in stellite, in which it plays an important part. In recent years the automobile and tractor industries have increased their demand for chromium-bearing steels to a marked degree. Chromium not only increases the elastic ratio in such steels but when it is combined with vanadium the anti-fatigue values are decidedly augmented. In this connection mention should also be made of the important role of chromium in high speed steels, the demand for which during the war exceeded all records.

Among the more recent alloys employing chromium are those entering into stainless steel and permanent magnet steel. The former, a moderately high carbon steel containing about 14 per cent of chromium, had already gained prominence in the British cutlery industry before the war. Latterly its use has expanded phenomenally in Great Britain where it is understood about 200 tons per month is passing directly into cutlery. In this country there have been various impediments to so rapid an introduction into the hardware trade. More interesting still, however, is the use of stainless steel in exhaust valves for air-cooled gas engines. Toward the close of the war, it was being used in airplane engines very successfully because of its non-corrodibility, resistance to heat and other properties and the prospect for its use in air-cooled automobile engines is already bright. Because of the high price and scarcity of tungsten early in the war, a new steel, using chromium in

place of tungsten, was developed which to-day has a wide and efficient use in permanent magnets. Mention should be made, also, of ni-chrome and other special alloys, which are playing an important part in industrial progress.

Before the war a large part of the ferrochromium used in producing most of the products named above was foreign made. During the war there were practically no imports after early 1915. To-day, while considerable is again coming from other countries the American product is predominant. There are now seven domestic producers of ferrochromium, several of them being developed by the war. Their existence on a commercial scale is due to the electric furnace, while the efficiency of chromium as of other metals in alloy steel is largely a product of latter-day progress in heat treatment.

### Freer Working of Patents

American inventors are discussing the radical innovation in patent practice known as "licenses of right," which is contained in the new British patent act. Their interest centers on two considerations, the one the possibilities of the idea as applied to the patent laws of the United States, the other its effects upon American inventions within the United Kingdom. While the first impression is, on the whole, favorable, it remains to be seen how the idea will work out in practice.

Briefly, the inventor may apply to the comptroller of patents to have his patent indorsed, "licenses of right," and if the application be granted—the comptroller having discretionary power—any person is at any time entitled to a license to manufacture under the patent, and if the parties to the license cannot agree upon terms they shall be fixed by the comptroller. In other words the inventor places his invention on the market through the agency of the patent office, which is presumed to see that he is properly recompensed. Others will work his invention, or at any rate others are given the right to work it; hence the patent is presumed to have complied with the compulsory working clause, after the period of four years, beyond which the patentee's rights would otherwise be in jeopardy. It is further provided that in an action for infringement of a patent indorsed "licenses of right," if the defendant is ready and willing to take a license the plaintiff is not entitled to an injunction, and the amount of damages recoverable is limited; also, that the licensee may call upon the patentee to take proceedings to prevent infringement of the patent, and if the patentee refuses may institute proceedings himself, making the patentee a defendant, which does not, however, render the patentee liable to any expense unless he actually takes part in the proceedings.

The effect of a similar proviso in the American patent law might be of very great importance, it is argued. The inventor would have opened to him an easy means of marketing his invention, if it were worth marketing, and especially would this mean a great deal to the inventor having

small financial resources. Let us suppose that an inventor had a radical improvement on a quick-change gear mechanism used in machine tools. Instead of personally soliciting the builders in the hope that some one concern would take up his idea and develop it on a large scale, on a royalty basis, or would pay a large sum outright for an exclusive assignment of the patent, the inventor could have the "licenses of right" endorsement affixed to his patent papers. This would call the attention of all interested to the fact that any one or all of them might have the privilege of securing the use of the invention. In this way the inventor's market would be broadened and the money reward of his genius might be greater than if he had dealt with a single corporation. The invention might be a process or an appliance used in making steel, or applicable to one of a hundred other uses so broad in scope that it could be taken up profitably by all manufacturers in the particular field. In this way, it is argued, the world would be the better served.

The application of the principle might also be made with economic gain to another and very large class of inventions, comprising devices complete within themselves, each practically worthless as a manufacturing proposition by itself, but valuable when produced in conjunction with similar articles. Examples of this class frequently arise in the hardware industry. To place wide open for use an invention of this character might give it a value which could be secured for it in no other way.

The administration of such a patent, especially in its possible adoption in this country, suggests the bill now before Congress, providing that the Federal Trade Commission "be empowered to accept assignments of, or license under, to develop or to encourage the industrial use of patents and patent rights tendered it by employees of the various departments or other establishments of the Government, or by other individuals or agencies." This bill is intended to unify the practice of the various departments of the Government in the matter of inventions made in the Government service. The intention is very much along the line of "licenses of right," in that the Government would issue licenses for inventions for the benefit of the inventors. Probably, should it ever be decided to accept the new British practice here, in case it works out as practical and valuable, the machinery for operating it would not be difficult to establish.

There remains the question as to the effect the new British act will have on American holders of British patents. The first impression is favorable; no hardship is suspected, and in some cases tangible advantages are seen. "Licenses of right" seem to be a fair alternative to compulsory working. The inventor does not lose his chance to profit by his idea, if his patent is indorsed for the offering of licenses to work the invention. It is even possible that "licenses of right" will prove an inducement to American inventors to take out British patents, since in this way the problem of marketing the invention in the United Kingdom might become less difficult and less expensive.



### New Coal Pulverizing Plant

The New England Coal & Coke Co., Everett, Mass., expects to have in operation some time in July a new coal pulverizing plant with a minimum output capacity of 200 tons and a maximum capacity of 600 tons per hour, the contract having been let within the past day or so. The company to-day is operating a much smaller pulverizer, which it has outgrown.

The company's foundry coke average is 1600 tons daily, virtually all of its operating batteries being devoted to foundry business. The company has 400 ovens, but as a coal conservation measure, due to the uncertainty of the future supply situation, is operating but 300 ovens.

### M. A. Hanna & Co. Take Over Bessie Furnace Co.

Effective from April 1, M. A. Hanna & Co., Cleveland, take over the operation and sales of the product of the Bessie Furnace Co., New Straitsville, Ohio, formerly handled by the Allen S. Davison Co., Oliver Building, Pittsburgh, which gave up its interest in this furnace March 31, after operating the plant and selling its product for five years. For some time Bessie furnace has been operating on silvery iron.

### Declared a Common Carrier

A decision of the Pennsylvania Public Service Commission last week holds that the Pittsburgh, Allegheny & McKees Rocks Railroad, an industrial railroad operating in Allegheny Co., Pa., and owned by the Pressed Steel Car Co., is a common carrier and entitled to be paid out of the line rate haul of these trunk line carriers: Pittsburgh & Lake Erie; Pittsburgh, Chartiers & Youghiogheny; Baltimore & Ohio, and Pittsburgh, Fort Wayne & Chicago railroads. This decision was given in one of a series of industrial railroad complaints. The commission says that, as the companies are now out of Federal control, they should make arrangements for the payments.

### New Pipe and Fittings Co.

Plans are being formulated for a company to act as the Boston and New York selling agency for The Birmingham Pipe & Fittings Co., Inc., Birmingham, Ala., a recently organized corporation starting with a paid in capital of \$100,000. The new company will occupy the site of the old city rolling mill, formerly the property of the Republic Iron & Steel Co., Birmingham, consisting of about 20 acres, a foundry and several other buildings, private water power, and two spur tracks. The price paid for the property was \$12,000. The company will make cast iron pipe and fittings. W. J. Breen, W. J. Breen & Co., Boston, pig iron, will have a substantial interest in the Boston and New York agency for the new corporation.

### Machinery Company Absorbed

The Sturtevant Mill Co., Boston, crushing, grinding, screening, weighing, mixing and elevator machinery, a Maine corporation, has been taken over by a Massachusetts corporation of the same name. The plant of the company is at Harrison Square, Dorchester, Boston. The Massachusetts corporation is capitalized for \$1,000,000, divided into 3000 shares of common stock, par \$100, and 7000 shares of 7 per cent cumulative preferred, par \$100, of which all of the common and 4152 of the preferred have been issued in exchange for the Maine company's securities.

### British Pig Iron Output in 1919

The output of pig iron in Great Britain in 1919 was 7,398,000 gross tons or 617,000 tons per month. This compares with 10,260,000 tons in 1913 and 9,072,000 tons in 1918. The 1919 output was composed of 232,000 tons of hematite iron, 198,000 tons of basic iron, 171,000 tons of forge and foundry iron and 16,000 tons of ferroalloys.

## CONTENTS

Material Handling Features Ohio Foundry.....	1009
French War Output of Munitions.....	1011
Automatic Control Panel for Motor-Generator Sets.....	1012
Taylor Society at Rochester.....	1012
Anti-trust Cases Postponed at Washington.....	1012
Heavier Equipment for All Mining Work.....	1013
Machine for Grinding Taps.....	1014
Italian Steel Industry Seriously Handicapped.....	1015
Complete Program for Foreign Trade Convention.....	1016
United States Steel Products Wishes to Operate Steamship Lines.....	1016
Duplexing with the Cupola.....	1017
Rail Failures Due to Seams.....	1017
Electric Car Hauling Winch.....	1018
Brass Manufacturers' Meeting.....	1018
Carborundum Company Makes Extensions.....	1018
Electric Practice in Making Ferroalloys.....	1019
Atkins 6½-In. Slotting Machine.....	1022
Preparing to Store Large Tonnages of Coal at Youngstown.....	1022
British Steel Exports in February Show Gains.....	1022
Lorraine Steel Works in French Hands.....	1023
Practical Plans to Carry on Safety Work.....	1025
Detecting Defects in Metals with the X-Ray.....	1027
Conditions at New England Foundries.....	1028
Brazil a Market of the Future.....	1029
Machine Tools in Java.....	1029
The Shop Committee—A Stimulus to Production.....	1030
Size Comparison of New Bending Rolls.....	1032
Severe Steel Shortage in Canada.....	1032
Lifting Restrictions on Foreign Commerce.....	1033
Influence of Cadmium on the Properties of Brass.....	1034
Application of Heat Treatment to Non-Ferrous Alloys.....	1035
Conditions at Steel Works in Youngstown District.....	1036
Safety Congress Will Meet in Milwaukee.....	1036
Ford Motor Co. Investment Plan.....	1037
Labor Notes.....	1037
Power Hammer for Pulverizing Pig Iron Samples.....	1038
Causes of Economic Troubles.....	1038
Public Representation in Wage Adjustment.....	1038
Daily Pay Day at Burroughs Plant.....	1038
German Iron and Steel Production.....	1039
Harvard Engineering School Inaugurates Industrial Cooperation.....	1039
Little Merchant Iron Being Made in the Valley.....	1039
Editorials: Preparing to Store Coal—Steel Production in 1919—The Role of Chromium—Freer Working of Patents.....	1040-1042
Production Heavier in Pig Iron.....	1044
Iron and Steel Markets.....	1046
American Trade Prospects in China.....	1060
Financial Reports of Iron and Steel Companies.....	1062
Correspondence: Chart for Testing Steel Wire—Specifications for Welding Wire—Commended for Patriotic Service.....	1066-1067
Personal.....	1068
Obituary.....	1070
New Sheet Capacity in Ohio.....	1072
Dominion Steel Corporation Activities.....	1072
Slick-Knox Steel Co. Extensions.....	1072
Massachusetts Iron & Steel Co. Acquires Danvers Iron Works.....	1072
Steel Treaters' Societies Merged.....	1072
Southern Pacific to Make Electric Steel.....	1072
Machinery Markets and News of the Works.....	1073-1084
Office Changes.....	1084
Westinghouse Air Brake Company Report.....	1084
New Trade Publications.....	1085
Current Metal Prices.....	1086

### Buys Susquehanna Iron Co. Plant

The Reading Iron Co., Reading, Pa., has purchased the plant of the Susquehanna Iron Co., Columbia, Pa., which includes eight double and 15 single puddle furnaces together with an 18-in. puddle mill train, with a capacity of approximately 1400 tons per month. The plant will be extensively repaired and put in operation without delay.

Two other plants, those of the George B. Lessig Co., Pottstown, Pa., and of the Brooke Puddle & Nail Mill, Birdsboro, Pa., were recently purchased by the Reading company, and are now in operation in addition to other plants in Reading, Pa., Danville, Pa., and Emaus, Pa. A total of almost 7000 men is employed.

## PRODUCTION HEAVIER IN PIG IRON

### Pig-Iron Output in March 6180 Tons a Day Greater

#### A Net Gain of Eight Furnaces—Ferroalloy Ton- nage Heaviest Since 1918

The production of coke and anthracite blast furnaces in March, a 31-day month, amounted to 3,375,907 gross tons or an average of 108,900 tons daily as compared with 2,978,879 tons, or 102,720 tons daily in February, a 29-day month, and 2,277,507 tons, or 99,685 tons daily in March, 1919, a 31-day month. On April 1 there were 312 furnaces, with an estimated daily capacity of 109,585 gross tons active as compared with 304 furnaces of an estimated capacity of 104,580 tons in blast March 1, 19 having been blown in and 11 blown out in the past month.

The output of ferroalloys in March was 35,275 tons, the largest output of any month this year, or of any month of 1919. Of this total 19,803 tons was ferromanganese.

#### Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for March, and the three months preceding:

Pig Iron Production by Districts—Gross Tons				
	Mar. (31 days)	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)
New York.....	210,036	158,710	154,090	134,609
New Jersey.....	4,789	1,961	0	3,732
Lehigh Valley.....	90,271	65,881	99,382	81,347
Schuylkill Valley.....	101,399	94,541	95,569	80,901
Lower Susque- hanna and Leba- non Valleys.....	43,136	32,808	46,670	36,667
Pittsburgh district..	746,933	686,903	695,442	653,273
Shenango Valley....	162,845	147,358	150,977	146,822
Western Pennsylv- ania.....	192,500	163,092	164,616	144,432
Maryland, Virginia and Kentucky....	101,248	82,345	79,622	66,662
Wheeling district....	143,905	117,597	83,630	57,325
Mahoning Valley....	306,720	290,485	299,597	277,450
Central and North- ern Ohio.....	315,551	284,985	267,861	206,020
Southern Ohio.....	78,486	77,443	64,461	64,124
Chicago district....	538,215	466,453	487,840	385,399
Mich., Minn., Mo., Wis., Colo. and Wash. ....	111,552	99,244	98,487	77,164
Alabama.....	204,816	185,237	202,236	202,105
Tennessee.....	23,582	23,836	24,701	15,236
Total.....	3,375,984	2,978,879	3,015,181	2,633,268

#### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from March, 1919, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
March, 1919.....	73,468	26,217	99,685
April.....	61,289	21,318	82,607
May.....	51,187	16,815	68,002
June.....	51,865	18,630	70,495
July.....	61,503	16,837	78,340
August.....	68,018	20,478	88,496
September.....	60,954	21,978	82,932
October.....	41,796	18,319	60,115
November.....	57,589	22,156	79,745
December.....	61,815	23,129	84,944
January, 1920.....	72,015	25,249	97,264
February.....	75,230	27,490	102,720
March.....	80,021	28,879	108,900

The figures for daily average production, beginning with January, 1914, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1914—Gross Tons							
	1914	1915	1916	1917	1918	1919	1920
Jan.	60,808	51,659	102,746	101,643	77,799	106,525	97,264
Feb.	67,453	59,813	106,456	94,473	82,835	105,006	102,720
Mar.	75,738	66,575	107,667	104,882	103,648	99,685	108,900
Apr.	75,655	70,550	107,592	111,165	109,607	82,607	.....
May	67,506	73,015	108,422	110,238	111,175	68,002	.....
June	63,916	79,361	107,053	109,002	110,793	70,495	.....
July	63,150	82,691	104,017	107,820	110,354	78,340	.....
Aug.	64,363	89,666	103,346	104,772	109,341	88,496	.....
Sept.	62,753	95,085	106,745	104,465	113,942	82,932	.....
Oct.	57,361	100,822	113,189	106,550	112,482	60,115	.....
Nov.	50,611	101,244	110,394	106,859	111,802	79,745	.....
Dec.	48,896	103,333	102,537	92,997	110,762	84,944	.....

## Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steelmaking iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

#### Production of Steel Companies—Gross Tons

	Total production—			Spiegeleisen and ferromanganese		
	1918	1919	1920	1918	1919	1920
Jan.	1,756,208	2,430,022	2,232,455	30,695	32,787	23,957
Feb.	1,620,254	2,209,470	2,181,679	26,114	28,105	28,038
Mar.	2,349,419	2,277,507	2,480,668	39,122	26,644	35,275
Apr.	2,411,488	1,838,677	.....	35,511	17,308	.....
May	2,513,577	1,586,805	.....	54,633	14,604	.....
June	2,407,166	1,655,944	.....	44,844	14,254	.....
July	2,456,693	1,906,604	.....	51,762	14,805	.....
Aug.	2,509,357	2,108,566	.....	54,009	17,419	.....
Sept.	2,507,381	1,828,613	.....	66,275	20,631	.....
Oct.	2,594,277	1,295,690	.....	70,379	20,238	.....
Nov.	2,501,867	1,727,656	.....	59,638	19,964	.....
Dec.	2,524,794	1,916,249	.....	49,435	15,718	.....

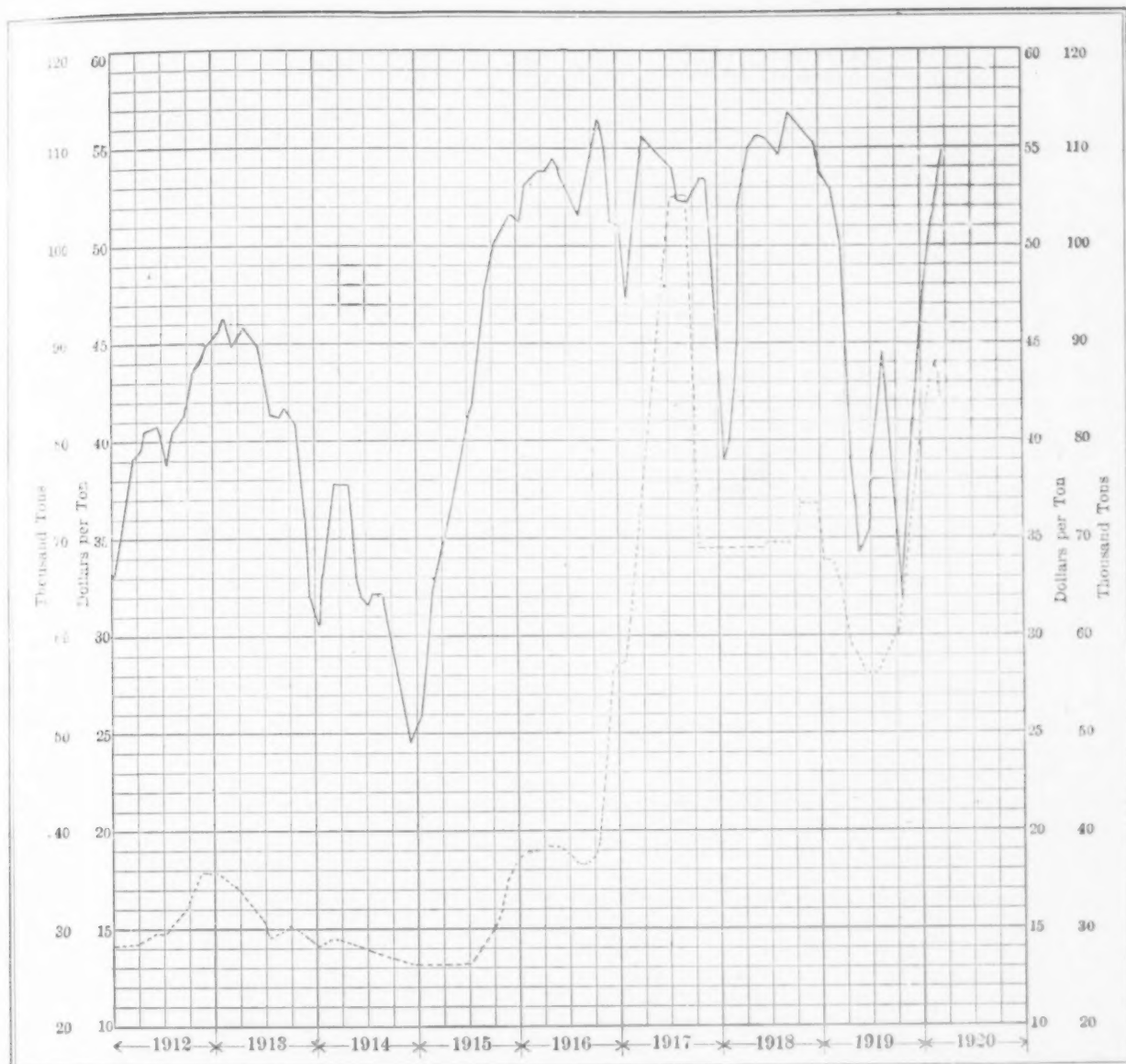
The furnaces blown in include No. 6 Lackawanna and No. 2 Donner in the Buffalo district; Genesee in northern New York; Oxford in New Jersey; Crumwold in the Lehigh Valley; one Lebanon and Sheridan in the Lebanon Valley; No. 4 Carrie in the Pittsburgh district; Sharon in the Shenango Valley; one Johnstown in western Pennsylvania; the new E stack of the Maryland Steel Co. in Maryland; No. 1 Otis in northern Ohio; Globe and Jisco in southern Ohio; No. 7 South Chicago (new) and No. 12 Gary in the Chicago district; Philadelphia and Alice in Alabama.

Among the furnaces blown out are No. 1 Crane in the Lehigh Valley; Nos. 3 and 5 Carrie, No. 6 Duquesne and one Edgar Thomson in the Pittsburgh district; Atlantic in the Shenango Valley; one Virginia Iron, Coal & Coke stack in Virginia; No. 1 Bellaire in the Wheeling district; No. 2 Hubbard in the Mahoning Valley, and Ironton in southern Ohio.

#### Capacities in Blast April 1

The following table shows the number of furnaces in blast April 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast March 1:

Coke and Anthracite Furnaces in Blast					
Location of Furnaces.	Total stacks	Apr. 1		Mar. 1	
		In blast	Capacity per day	In blast	Capacity per day
<b>New York:</b>					
Buffalo.....	22	18	6,645	16	5,620
Other New York..	4	3	625	2	330
New Jersey.....	4	2	280	1	105
<b>Pennsylvania:</b>					
Lehigh Valley....	18	10	2,660	10	2,060
Spiegel.....	2	2	220	2	185
Schuylkill Valley..	14	11	3,315	11	3,300
Lower Susquehanna	8	2	630	2	630
Ferro.....	2	2	135	2	125
Lebanon Valley....	9	4	625	2	350
Ferro.....	1	1	45	1	45
Pittsburgh District.	53	49	22,165	52	23,590
Ferro and Spiegel	5	3	630	3	545
Shenango Valley..	27	17	5,560	17	5,170
Western Penn.....	27	19	5,755	19	5,565
Spiegel.....	1	1	75	1	75
Maryland.....	5	5	1,380	4	1,265
Wheeling District..	15	11	4,565	12	4,495
<b>Ohio:</b>					
Mahoning Valley..	27	23	9,910	24	10,260
Central & North....	26	23	10,275	22	9,825
Southern.....	16	13	2,455	12	2,625
Illinois and Ind....	40	35	18,165	34	16,325
Ferro.....	1	1	50	0	0
Mich., Wis. and Minn.	13	8	2,700	7	2,435
Colo., Mo. and Wash.	8	3	1,000	3	1,000
<b>The South:</b>					
Virginia.....	17	9	1,225	10	1,190
Kentucky.....	7	5	850	5	650
Alabama.....	45	23	6,835	21	5,965
Tennessee.....	17	9	810	9	850
Total.....	434	312	109,585	304	104,580



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

#### Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1910 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2 X at Philadelphia. They are based on the weekly quotation of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920
Jan. ...	3,185,121	3,150,938	2,411,768	3,302,260	3,015,181
Feb. ...	3,087,212	2,645,247	2,319,299	2,940,168	2,978,879
Mar. ...	3,337,691	3,251,352	3,213,091	3,090,243	3,375,907
3 mos.	9,610,024	9,047,537	8,944,158	9,332,671	9,369,967
Apr. ...	3,227,768	3,334,960	3,288,211	2,478,218	.....
May ...	3,361,073	3,417,340	3,446,412	2,108,056	.....
June ...	3,211,588	3,270,055	3,323,791	2,114,863	.....
July ...	3,224,513	3,342,438	3,420,988	2,428,541	.....
Aug. ...	3,203,713	3,247,947	3,389,585	2,743,388	.....
Sept. ...	3,202,366	3,133,954	3,418,270	2,487,965	.....
Oct. ...	3,508,849	3,303,038	3,486,941	1,863,558	.....
Nov. ...	3,311,811	3,205,794	3,354,074	2,392,350	.....
Dec. ...	3,178,651	2,882,918	3,433,617	2,633,268	.....
Total					
Yr. ...	39,039,356	38,185,981	38,506,047	30,582,878	.....

\*These totals do not include charcoal pig iron. The 1918 production of this iron was 347,224 tons.

#### Blast Furnace Notes

The Sparrows Point, Md., plant of the Bethlehem Steel Co. blew in its new E furnace on March 20.

The Carnegie Steel Co. blew out its No. 5 Carrie furnace in the Pittsburgh district on March 28 and blew in its Sharon furnace in the Shenango Valley.

Ironton, Ohio, furnace of the Marting Iron & Steel Co. was blown out on March 25.

The Illinois Steel Co. blew in its No. 1 Joliet furnace on March 25 and blew out its No. 2 furnace on March 26. No. 7 South Chicago furnace was blown in March 26.

Technologic Paper No. 156, United States Bureau of Standards, "The Metallographic Features Revealed by the Deep-Etching of Steel," states that the deep-etching of steel by concentrated acids may reveal three different structural conditions: Chemical heterogeneity (segregation); mechanical non-uniformity (initial stresses), and physical discontinuities within the metal. A marked roughening of the surface indicating chemical heterogeneity is due to the greater solubility of the impurities and the widening and deepening of the resultant pits. Hardened steel balls, highly stressed as a result of the treatment received will often spontaneously split when deeply etched. Physical discontinuities may exist within steel such as rails, as internal fractures. The metal is in such intimate contact that the defects cannot be located by ordinary means. They may be located by magnetizing the polished specimen and then bathing it in iron dust in kerosene.



# Iron and Steel Markets

## OUTPUT UP, PRICES STRONG

### Pig Iron at 40,000,000 Tons Per Year

#### Pittsburgh Embargo on New York and Chicago Shipments—Good Export Demand

Increased production, somewhat better car supply, sustained consumption both at home and abroad, and no evidence in actual transactions of any yielding in the prices at which independent steel companies have been selling finish steel are the outstanding facts of the week.

In spite of all handicaps in cars and fuel, pig iron output again increased in March. The total was 3,375,907 tons, or 108,900 tons per day, against 2,978,879 tons in February, or 102,720 tons a day. The March rate means 40,000,000 tons a year, whereas the record for a calendar year was 39,435,000 tons in 1916.

In March, 19 furnaces blew in and 11 blew out, so that 312 were active April 1 with capacity estimated at 109,585 tons a day, against 104,580 tons a day for 304 furnaces on March 1. The present rate of production is the highest since December, 1918. It points to a steel ingot output of 43,000,000 to 44,000,000 tons per year, or nearly 80 per cent of capacity.

But the backing up of finished steel on the mills has only been cured in spots. On Monday Pittsburgh shipments to Chicago and beyond were stopped by the Chicago switchmen's strike, and for several days previous there had been an embargo against New York and New England, tens of thousands of tons being piled up at Pittsburgh district warehouses and mills.

Reports from manufacturing consumers of steel show that the tightness in deliveries to them is not relaxed except perhaps in plates. But in semi-finished steel there is an easing up in some directions, and the extreme high prices for sheet bars are not so common.

Against the Steel Corporation's bookings for six to eight months ahead the independent companies have three to five months' business on their books in such lines as bars, pipe, plates and structural material.

At the annual meeting this week of the Consolidated Steel Corporation, the export company of 10 important independent producers, reports showed that March shipments were the best of the 15 months since the company was formed. Sales were also better than in February. England has placed good orders for billets and Italian shipyards are taking a round tonnage of plates. Canada, Japan, Australia and Africa have figured largely in the past year's exports.

Signs point to an increasing willingness on the part of the larger independent mills to sell more freely than has been the practice in late weeks, but in heavier products at the top rather than the intermediate prices of the wide range which has marked the market of 1920. In spite of the large productive capacity plate prices remain firm with export a continuing factor of strength.

Bars and wire products stand out in the recent bookings of the independent companies, and in both prices are strongly maintained.

The leading producer of sheets and tin plates will open its books on both products for delivery in the second half on April 13 at the prices now in effect. Contract prices of independent mills for delivery after July 1 are not yet named, but are expected to be between the March 21, 1919, schedule and the high figures that have ruled on early deliveries.

Railroad purchases of rolling stock while not spectacular are steadily proceeding. Each step toward financial arrangements indicates the way in which successive car orders will doubtless be placed. Thus car orders will be slowly cumulative. The New York Central in buying 8000 freight cars and 212 passenger cars orders little more than half what was expected. The Grand Trunk bought 4000, one-quarter of the lot to be built in Canada. The Baltimore & Ohio in inquiring for 3100 bodies represents another case of attempting to use existing under structures. The Burlington, which is seeking \$275,000 worth of machine tools, is expected shortly to close on 1500 cars and car builders look for early inquiries from the Pennsylvania. Very little railroad bridge work is under active consideration and no great amount is expected in the early future.

Although the expected advance in the price of coke has been a factor for some time in the high prices of pig iron, the upward tendency is still attributed to that cause to a large extent. Sales of foundry iron to Westinghouse and other interests have been made at Cleveland at an advance of \$1 over recent quotations and some eastern Pennsylvania sellers have also advanced \$1. An eastern consumer is expected to buy a round tonnage of basic if it carries out its plan to increase its open-hearth output as soon as it can obtain coal.

The wage advances announced by the Frick Coke Co. range from 10 to 13 per cent and independent producers are expected to follow with similar increases. While sales of furnace coke have been made at \$10 to \$11, term contracts at flat prices are lacking and furnace companies are contesting present asking prices of the producers.

Estimates of the Lake Superior iron ore movement in 1920 range from 60,000,000 to 62,000,000 tons, or slightly under the average of the past three years. Car supply from lower lake docks to furnace yards promises to be the limiting factor. At 7,534,000 tons, ore stocks on Lake Erie docks April 1 were about 1,000,000 tons more than on that date last year, but stocks in furnace yards were more than a million tons less than on April 1, 1919, so that some furnace companies are urging early shipments from dock.

## Pittsburgh

PITTSBURGH, April 6.

Monday night, April 5, an embargo was declared on all shipments of iron and steel going to Chicago and through the Chicago gateway, due to the switchmen's strike in Chicago. There has been an embargo on for some days on shipments to New York, Brooklyn, and most New Jersey points. Hence local iron and steel concerns are not shipping a ton of material to either the Chicago or New York district, and this means that many thousands of tons of finished steel will be piled up until the embargoes are removed. For

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 6, 1920	Mar. 30, 1920	Mar. 9, 1920	Apr. 8, 1919
No. 1, Philadelphia...	\$47.05	\$46.05	\$45.35	\$31.90
No. 2, Valley furnace...	43.00	42.00	41.00	26.75
No. 3, Southern, Cin'ti...	43.60	43.60	43.60	30.35
No. 4, Birmingham, Ala...	40.00	40.00	40.00	26.75
No. 5, furnace, Chicago...	43.00	43.00	43.00	26.75
No. 6, del'd, eastern Pa...	44.80	44.80	43.40	29.65
Basic, Valley furnace...	42.00	42.00	41.00	25.75
Bessemer, Pittsburgh...	43.40	43.40	43.40	29.35
Malleable, Chicago...	43.50	43.50	43.00	27.25
Malleable, Valley...	43.00	43.00	42.00	27.25
Gray forge, Pittsburgh...	42.40	42.40	42.40	27.15
L. S. charcoal, Chicago...	56.50	56.50	57.50	38.85

### Rails, Billets, Etc.,

Per Gross Ton:	Apr. 6, 1920	Mar. 30, 1920	Mar. 9, 1920	Apr. 8, 1919
Bess. rails, heavy, at mill...	\$55.00	\$55.00	\$45.00	\$45.00
O.-h. rails, heavy, at mill...	57.00	57.00	47.00	47.00
Bess. billets, Pittsburgh...	60.00	60.00	60.00	38.50
O.-h. billets, Pittsburgh...	60.00	60.00	60.00	38.50
O.-h. sheet bars, P'gh...	80.00	80.00	65.00	42.00
Forging billets, base, P'gh...	80.00	80.00	80.00	51.00
O.-h. billets, Philadelphia...	64.10	64.10	64.10	42.50
Wire rods, Pittsburgh...	70.00	70.00	70.00	52.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	4.25	4.25	4.25	2.595
Iron bars, Pittsburgh...	4.25	4.25	4.25	2.35
Iron bars, Chicago...	3.75	3.75	3.50	2.50
Steel bars, Pittsburgh...	3.75	3.75	3.50	2.35
Steel bars, New York...	4.02	4.02	3.77	2.62
Tank plates, Pittsburgh...	3.75	3.75	3.50	2.35
Tank plates, New York...	4.02	4.02	3.77	2.92
Beams, etc., Pittsburgh...	3.25	3.25	3.00	2.45
Beams, etc., New York...	3.52	3.52	3.27	2.72
Skelp, grooved steel, P'gh...	2.75	2.75	2.75	2.45
Skelp, sheared steel, P'gh...	3.00	3.00	3.00	2.65
Skelp hoops, Pittsburgh...	4.00	4.00	4.00	3.05

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire.	Apr. 6, 1920	Mar. 30, 1920	Mar. 9, 1920	Apr. 8, 1919
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh...	5.50	5.50	5.50	4.35
Sheets, galv., No. 28, P'gh...	7.00	7.00	7.00	5.70
Sheets, blue an'd, 9 & 10...	4.50	4.50	4.50	3.55
Wire nails, Pittsburgh...	4.00	4.00	4.00	3.25
Plain wire, Pittsburgh...	3.50	3.50	3.50	3.00
Barbed wire, galv., P'gh...	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh...	\$7.00	\$7.00	\$7.00	\$7.00

### Old Material, Per Gross Ton:

Carwheels, Chicago...	\$37.00	\$37.50	\$35.00	\$21.00
Carwheels, Philadelphia...	40.00	42.00	42.50	24.00
Heavy steel scrap, P'gh...	27.00	27.50	27.00	15.50
Heavy steel scrap, Phila...	24.50	25.00	25.50	15.50
Heavy steel scrap, Ch'go...	24.50	24.50	23.50	16.50
No. 1 cast, Pittsburgh...	34.00	34.00	34.00	18.00
No. 1 cast, Philadelphia...	38.00	38.00	40.00	22.00
No. 1 cast, Ch'go (net ton)	37.00	38.00	37.50	22.00
No. 1 RR, wrot, Phila...	35.00	35.00	36.50	22.00
No. 1 RR, wrot, Ch'go (net)	27.00	28.00	26.00	16.00

### Coke, Connellsville,

Per Net Ton at Oven:	Apr. 6, 1920	Mar. 30, 1920	Mar. 9, 1920	Apr. 8, 1919
Furnace coke, prompt...	\$10.00	\$6.00	\$6.00	\$3.75
Furnace coke, future...	10.00	6.00	6.00	4.25
Foundry coke, prompt...	11.00	7.00	7.00	4.50
Foundry coke, future...	11.00	7.00	7.00	5.00

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	19.25	18.50	15.62½	15.62½
Electrolytic copper, N. Y.	19.25	19.00	18.37½	15.37½
Spelter, St. Louis...	8.00	8.50	8.60	6.30
Spelter, New York...	8.05	8.85	8.95	6.65
Lead, St. Louis...	8.75	8.75	9.15	5.00
Lead, New York...	9.00	9.00	9.50	5.25
Tin, New York...	63.25	63.75	60.25	72.50
Antimony (Asiatic), N. Y.	11.37½	11.50	12.00	6.62½

The above prices are for domestic delivery and do not necessarily apply to export business.

some time the supply of cars for shipments west as far as the Pacific Coast has been fairly good, so that more steel is piled up in local warehouses for eastern shipment than for the West. The American Sheet & Tin Plate Co. alone has 57,000 tons of finished tin plate and sheets piled up in its different warehouses, nearly all to go to eastern customers. Aside from the above, two embargoes, the supply of box cars for shipments to others places has been better than for a long time, and the heavy stocks of steel piled in various warehouses was moving out nicely until the embargoes east and west were declared.

Coke producers also report the supply of cars is better. The latter part of last week more cars were available for coke shipments than there were men to load them. This was due to the Easter holidays starting on Good Friday and lasting over and including Easter Monday, during which days the men did not come out for work. There was not only a loss of production in coke, but a serious delay in shipments. Local railroad officials promise that from this time on there will be steady betterment in the car supply and hundreds of cars, located in the West for sometime, are being unloaded and are being returned here for use of local shippers.

The American Sheet & Tin Plate Co. on Tuesday, April 13, will open its books for contracts for sheets and tin plate for third quarter and last half of the year delivery and at the prices in effect on these products under the March 21 schedule of last year. These prices are 350c. for No. 10 blue annealed sheets, 4.35c. for No. 28 American Bessemer black, and 5.70c. for No. 28 galvanized, while black plate for tinning is 4.35c. for No. 28 and coke tin plate is \$7 per base box. How much higher prices the independent mills will quote on sheets for last half delivery is yet to be known, but it is not believed there will be as large a

spread in last half of the year between the prices of the leading interest and the independent mills as there was in the first half. The supply of sheet bars is getting better and the very high prices being paid for these bars for conversion are gradually disappearing.

The coal and coke markets are still more or less unsettled, but prices on standard furnace coke for April shipment seem to have settled down to about \$10 and on foundry to about \$11, in net tons at oven.

Production of pig iron, semi-finished steel and finished steel products in March was very much heavier than in February, and the tension in regard to the supply of billets and sheet bars and nearly all kinds of finished steel is gradually being released. Consumers are likely to go slow in planning contracts for last half delivery, if they are confronted by the mills with very much higher prices than the Steel Corporation subsidiaries are quoting for that delivery, which are all based on March 21 schedule of last year.

**Pig Iron.**—W. P. Snyder & Co. report the average price on sales of basic iron in March to have been \$41.50, and on Bessemer \$42 at Valley furnace. A sale of about 4000 tons of basic iron to a local open-hearth steel interest made in March at \$43, Valley furnace, was not included in the table of sales determining the average price, as this iron was of special analysis, a sulphur limit of 0.03 being included in the contract. The output of pig iron in the Pittsburgh and Youngstown districts in March showed a heavy increase over February, in spite of the delay in receiving coke, and April is expected to show an increase in output over March. The local pig iron market is very quiet, no sales of moment having been reported in the past week. Consumers apparently are well covered for their needs of iron for the present, but pressure on the furnaces for deliveries is as strong as ever. One sale of 300 tons of standard Bessemer is reported at \$42 and several

small lots of plain No. 2 foundry have been sold at \$43 and higher.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being \$1.40 per gross ton:

Basic .....	\$42.00 to \$43.00
Bessemer .....	42.00
Gray forge .....	41.00 to 42.00
No. 2 foundry .....	43.00
No. 3 foundry .....	42.50
Malleable, Valley .....	43.00 to 43.50

**Billets and Sheet Bars.**—The acute shortage in the supply of billets and sheet bars, which has been a feature of the local market for some months, is gradually easing up, and the heavy premiums in prices for sheet bars, largely offered by automobile builders, are gradually disappearing. Asking prices on any available steel are now about \$60 for Bessemer or open-hearth 4 x 4-in. billets, about \$70 for Bessemer sheet bars, and \$80 for open-hearth sheet bars, the latter being harder to obtain than Bessemer bars. All the steel mills report increased production of steel and say their output in March was much larger than in February. There seems to be more efficiency in labor, especially among men working on a tonnage basis. In the prices quoted below the lower prices are those of the Carnegie Steel Co., which is strictly adhering to the March 21 schedule of last year.

We now quote 4 x 4-in. soft Bessemer and open-hearth billets at \$38 to \$60; 2 x 2-in. billets, \$42; Bessemer sheet bars, \$42 to \$70; open-hearth sheet bars, \$42 to \$80; and forging billets, ordinary carbons, \$80 to \$85 base, all f.o.b. Youngstown or Pittsburgh mill.

**Ferroalloys.**—Much uneasiness is being shown by steel producers over their supply of ferromanganese, deliveries of foreign being very light, and the scarcity of ores is cutting down output of domestic ferromanganese very materially. All the leading makers of domestic ferromanganese now quote \$200 per gross ton, delivered, for 76 to 80 per cent, for last half delivery, and it is said several fair-sized sales have been made at the new figure, but this is not confirmed. Spot domestic ferromanganese is held at \$250, and sales of several cars have been made at that price. Prices on all grades of ferroalloys are very firm.

We quote 76 to 80 per cent domestic ferromanganese \$200 for last half delivery and \$250 for prompt delivery, with a reduction of \$1.50 to \$1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at \$85 to \$90, and 18 to 22 per cent spiegeleisen at \$55 to \$57.50, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, \$56.50; 10 per cent, \$59.50; 11 per cent, \$62.50; 12 per cent, \$66.10. We quote 6 per cent silvery iron, \$45.75 to \$46.25; 7 per cent, \$50 to \$50.50; 8 per cent, \$52 to \$52.50; 9 per cent, \$54 to \$54.50, and 10 per cent, \$56.50 to \$57. An advance of \$3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of \$2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which has a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

**Structural Material.**—Actual lettings in the past week were small, but local fabricators continue to report inquiry active. In fact, local fabricators are not actively bidding on all new work coming up, being pretty well filled over the next six months. The McClintic-Marshall Co. has taken 1000 tons for machine shop buildings for the General Motors Corporation, Pontiac, Mich., and 200 tons for the Westinghouse Lamp Co., at Bloomfield, N. J. The American Bridge Co. has a factory building for the Studebaker Corporation at Detroit, 1000 tons. We continue to quote beams and channels up to 15 in. at 2.45c., this being the Carnegie Steel Co. price for delivery late in the year, while other mills quote from 2.90c. up to 4c., the price depending largely upon whether the buyer is a regular customer, the quantity and the delivery.

**Tin Plate.**—On Tuesday, April 13, the American Sheet & Tin Plate Co. will open its books on contracts for tin plate for last half delivery, at the same price now in effect for first half, which is \$7 per base box, for coke tin plate, f.o.b. mill. It is likely most independent mills will now start to sell for last half delivery at the same price; in fact, some independent mills have already booked a good deal of business for last half, on which the price was left open, but was to be that of the lead-

ing interest for last half delivery. Nearly all the mills will carry over into second half from two to three months' production of tin plate, their output having been cut down on account of scarcity of labor, steel and cars.

We now quote tin plate to domestic consumers for remainder of the year delivery at \$7 per base box, stock items \$8.50 to \$9, and for export \$11 to \$12 per base box, all f.o.b. Pittsburgh.

**Plates.**—The railroads are having trouble in arranging finances and the outlook for large car orders in the near future is not considered as encouraging now as it was when the roads went back to private ownership. The general demand for plates is heavy, the two leading local makers being practically filled for the remainder of this year, while smaller mills are filled up for three to four months.

We quote sheared plates of tank quality, ¼ in. and heavier, at 2.65c. to 3c. for very indefinite delivery, while prices on ¼-in. and heavier plates, named by mills that will agree to ship out in three to four months, range from 3.50c. to 4c. at mill.

**Sheets.**—The American Sheet & Tin Plate Co. will open its books on Tuesday, April 13, on contracts for sheets for third quarter and last half delivery at the March 21, 1919, schedule of prices, which this concern strictly observed in all its sales for first quarter and for second half. What action the independent mills will take in regard to accepting contracts for sheets for last half delivery and what prices they will name cannot be stated now, but it is believed prices to be quoted by the independent sheet mills for second quarter and also for last half delivery will be closer to those of the leading interest than for some time. In other words, the wide gap in prices on sheets of the leading interest and the independent mills is likely to be considerably narrowed. Operating conditions are good, the American Sheet & Tin Plate Co. and the independent mills reporting they are running at about 95 per cent of hot sheet mill capacity, and output is nearly that large. The prices named below are those of the leading interest for third quarter and last half delivery in the lower figures, while the higher figures are prices quoted by most independent mills for second quarter. The March shipments of sheets by the American Sheet & Tin Plate Co. were the largest in any one month since August, 1917, and its shipments of tin plate in March were the largest in any one month since July, 1918. This company still has about 57,000 tons of finished steel sheets and tin plates piled in its warehouses awaiting cars for shipment.

We quote No. 28 gage box annealed, one-pass black sheets at 4.35c. to 6.50c.; No. 28 galvanized, 5.70c. to 8.50c., and Nos. 9 and 10 blue annealed at 3.55c. to 6c., the lower prices named being the March 21 schedules, which are still named by the leading interest, while the higher prices represent a fair range of quotations by the independent mills.

**Wire Rods.**—There is an active demand for wire rods but the available supply in local mills is very light. We continue to quote soft Bessemer and open-hearth rods at \$70 and high carbon rods at \$80 to \$100 at mill.

We quote wire nails at \$3.25 base, this being the price of the American Steel & Wire Co., and \$4 base on the new card recently issued by four or five of the independent mills. We quote bright basic wire at \$3, this being the price of the American Steel & Wire Co., and \$3.50, this being the price of most of the independent mills.

**Hot-Rolled Strip Steel.**—It is likely that several local makers may soon open their books for contracts on last half of the year delivery, some leading consumers insisting that the mills cover them for that period. We quote hot-rolled strips to regular customers at 5c. to 7c. at mill, for shipment at convenience of the mill, but on some inquiries 8c. to 10c. at mill is quoted.

**Cold-Rolled Strip Steel.**—Makers have not yet opened their books for last half, but some may do so in a short time. Local mills report they are well sold up over second quarter. Prices range from 7c. to 10c. per lb. at mill.

**Cold-Rolled Steel Bars.**—Several local makers are now inclined to regard 5c. at mill as their minimum price on contracts for second quarter and over last



half of the year. Most makers of shafting are sold up over first half and only in very exceptional cases have taken any orders for second half delivery. We quote cold-rolled steel bars from 5c. to 7c. at mill, prices depending on the quantity and the delivery wanted.

**Iron and Steel Bars.**—Local mills have practically no iron and steel bars to sell for first half delivery, and on steel bars the two leading local makers are sold up over the remainder of this year. The demand for reinforcing steel bars is reported larger than for some months, due to more active building operations.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 4c. at mill, prices depending entirely on the buyer and the delivery wanted. The demand for concrete reinforcing steel bars is fairly active, and we quote these, when rolled from billets, at 4c. to 4.25c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.25c. to 4.50c., and refined iron bars 4.50c. to 5c. in carloads, f.o.b. mill, Pittsburgh.

**Hoops and Bands.**—On these products the Carnegie Steel Co. is adhering rigidly to its price of 3.05c. on the March 21 schedule of last year and is practically sold up for this year. Two other local mills, that can make delivery of hoops and bands in three to four months, quote 4.50c. to 5c. at mill.

**Nuts, Bolts and Rivets.**—An advance in prices on these products is said to be likely at an early date for last half delivery. Local makers are sold up over second quarter and report demand very active. Prices on rivets and discounts on nuts and bolts are given on page 1065 and makers report they are holding very firm and are not being shaved.

**Spikes.**—No large inquiries for standard spikes from the railroads have come out recently, but it is known that some large railroad systems have not covered their needs over this year, and are expected to come in the market at an early date. The demand for boat and small spikes is reported quite heavy.

We quote standard spikes,  $\frac{1}{2}$  to 9/16 in. and larger, \$4 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes,  $\frac{3}{8}$  in. and 7/16 in., \$4.50; 5/16 in., \$5; boat and barge spikes, \$4.25, f.o.b. Pittsburgh. Tie plates \$3 to \$4 per 100 lb.

**Boiler Tubes.**—Local makers report demand for stationary and locomotive tubes active, and they are well sold up over the remainder of this year. Prices are very strong and discounts on iron and steel tubes are given on page 1065.

**Iron and Steel Pipe.**—The same conditions prevail in the iron and steel pipe market that have ruled for some months. Makers of both iron and steel pipe are steadily turning away orders on which they cannot make delivery. All the mills are practically sold up for the remainder of this year, if they do not enter another ton. The Standard Oil Co. is reported to be placing some orders with new sources of supply. Several leading mills report new orders entered in March were larger than output. These orders were simply forced on them, buyers taking chances on getting deliveries. Discounts on iron and steel pipe are given on page 1065.

**Coke.**—On Tuesday afternoon, April 6, a meeting of independent coke producers was held in this city to discuss the new wage scale for coal miners and coke workers to be effective from April 1. It is quite likely the independent coke operators will agree to give their men practically the same advance in wages as announced last week by the Frick Coke Co., which ranges from 10 to 13 per cent, depending on the kind of labor. When the new figures are finally agreed upon, but which are not available at this writing, there may be some slight variations in wages paid at different coke plants for the same kind of labor, but this will be due to unusual working conditions existing at some plants. A local producer of high grade furnace coke has made a contract for 24,000 tons per month over second half of this year, with an Eastern furnace interest, on about a five to one sliding scale basis; in other words, the price of coke is to be at a minimum price of \$5.25 at oven with basic iron at \$25 at Valley furnace, and for each advance of \$1 on basic iron, the price of the furnace coke goes up 25c. There is a minimum price of \$5.25 and maximum price of \$10

in the contract. Consumers and producers of coke are very wide apart in their ideas as to prices on furnace and foundry coke, and a waiting game is being played. Consumers take the position that the ideas of producers as to prices of coke are inflated, and they will have to come down. No contracts at flat prices are being made, and very little coke is being sold for prompt shipment, as not much is available. Output of coke last week and also shipments were greatly retarded on account of the Easter holidays which extended from Good Friday until Easter Monday, the men not reporting for work for four days. We quote standard grades of blast furnace coke at \$10 to \$11, and standard grades of 72-hr. foundry coke at \$11 to \$12 per net ton at oven. It is expected that about these prices will rule on sales of furnace and foundry coke for April delivery.

**Old Material.**—The local market on scrap is practically stagnant as far as sales go, not enough material having been sold recently to consumers to establish actual prices. The dealers are picking up some small lots from the smaller interests, and are applying them on their contracts. The movement in scrap to consumers is better, and no embargoes are on at present to any consuming points. Dealers firmly believe that prices of scrap will soon show a turn for the better, as it is known that stocks of consumers are not heavy, having been steadily drawn upon for some time. Prices are inclined to weakness and on a firm offer from a consumer it is probable that prices on some of the grades of scrap given below might be shaded probably 50c. to \$1 per ton.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$27.00 to \$27.50
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa.; and Pittsburgh	33.00 to 34.00
Compressed steel	23.00 to 23.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh district	18.00 to 18.50
Bundled steel stamping	17.00 to 17.50
No. 1 busheling	19.00 to 20.00
Railroad grate bars	28.00 to 29.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) $\frac{1}{4}$ in. and heavier	31.00 to 32.00
Railroad malleable	31.00 to 32.00
Iron car axles	38.00 to 39.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Cast iron wheels	41.00 to 42.00
Rolled steel wheels	29.00 to 30.00
Machine-shop turnings	17.00 to 17.50
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	33.00 to 34.00
Cast iron borings	19.00 to 19.50
No. 1 railroad wrought	33.00 to 34.00

The results of forty-one steaming tests conducted at the fuel-testing station, Ottawa, Canada, are discussed in detail in bulletin 27, issued by the Department of Mines, Canada. The coals tested were samples from mines in the Province of Alberta. Copies of the bulletin can doubtless be had by addressing Eugene Haanel, director Mines Branch, Department of Mines, Canada.

A power house with modern equipment to develop 1000 hp. is rapidly nearing completion at the works of the Conneaut Shovel Co., Conneaut, Ohio. It is expected to be in full operation within the next thirty days. Ground was broken last October, and the cornice and part of the stack remain to be completed.

C. H. Newcomb, manager of the Philadelphia office of Crocker Brothers, pig iron, alloys and coke, has returned from Pinehurst, N. C., where he has been for four months recuperating from an illness.

The Quick Action Chuck Co., Grand Rapids, Mich., announces that the Superior Collet Chuck Co., of the same city will manufacture the quick action collet chuck described in THE IRON AGE issue of March 25, page 887.

## Chicago

CHICAGO, April 6.

Operating difficulties again take the center of the stage. As the result of a heavy snow storm Sunday the plants of the Inland Steel Co., the Republic Iron & Steel Co., and the Interstate Iron & Steel Co. at Indiana Harbor and East Chicago were unable to resume operation until late yesterday, and a strike of switchmen on Chicago railroads makes another shut-down probable. The latter factor, together with a shortage of fuel, forced the Wisconsin Steel Works at South Chicago to bank one furnace and shut down one mill. The Highland Iron & Steel Co., West Pullman, is also closed on account of lack of coal. The railroad switchmen are striking without the authority of either of the two national unions, and the latter, in fact, are sending men here from other points to fill the places of those who walked out. For this reason it is felt that the strike will be broken soon. The coal situation, however, cannot be remedied so soon, as the general transportation situation is unsatisfactory, and some mines, notably in Illinois and Kansas, are now inactive because the miners are dissatisfied with phases of the wage awards. Dispatches from various sections of the Illinois bituminous fields indicate that 20 mines have been closed by the strike. Approximately 3000 miners have quit work. The plants of the leading interest have not yet been seriously affected by the local railroad strike, but on account of unsatisfactory deliveries of coking coal from the East are experiencing difficulty in maintaining the rate of output of a week ago. Business from railroad sources continues to develop in good volume.

The New York Central has ordered 8000 freight cars and the Grand Trunk 4000, while the Baltimore & Ohio is inquiring for 2100. Considerable car repair work is also being placed.

**Pig Iron.**—The market is sluggish and in some departments weaker. While two Southern furnaces are still quoting foundry at \$42 base, Birmingham, three other makers are offering both prompt and last half delivery at \$40. A Virginia producer, however, has advanced its price to \$44 base, furnace, and has taken an order for 450 tons in this district at that quotation. The only large order of recent date calls for 1500 tons of malleable for delivery at a Wisconsin foundry during second half. This tonnage brought the ruling Chicago price. The same buyer is in the market for 1200 tons of foundry for the same delivery. The activity of the railroads, noted in another paragraph, is expected to result in increased demand for both basic and malleable. Copper free low phosphorus now seems to be firm at \$53, Ohio furnace or better, although some resale material has been offered at as low as \$50. Beehive foundry coke is now selling at \$12 and \$12.50, Connellsville, while the local by-product coke is commanding \$14.50, Chicago.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average sil.	
1.50 (other grades subject to usual	
differentials), deliv. at Chicago...	\$56.50
Northern coke, No. 1, sil. 2.25 to 2.75	45.25
Northern coke foundry, No. 2, sil.	
1.75 to 2.25 .....	43.00
Northern high phos. foundry .....	43.00
Southern coke No. 1 foundry and	
No. 1 soft, sil. 2.75 to 3.25 .....	\$48.20 to 50.20
Southern coke, No. 2 foundry, sil.	
2.25 to 2.75 .....	46.70 to 48.70
Southern foundry, sil. 1.75 to 2.25 .....	45.00 to 47.00
Malleable, not over 2.25 sil. ....	43.50
Basic .....	42.00
Low phos. (copper free) .....	53.00
Silvery, 7 per cent. ....	\$56.40 to 56.80

**Ferroalloys.**—There is little change in the situation. Ferromanganese continues strong and 50 per cent ferrosilicon seems somewhat firmer, with a tendency toward a higher price.

We quote 76 to 80 per cent ferromanganese, last half, \$200; spot, \$235 to \$250; 50 per cent ferrosilicon at \$85 delivered; spiegeleisen, 18 to 22 per cent, \$60 furnace.

**Railroad Rolling Stock.**—Although the railroads did not make the wholesale purchases of rolling stock looked for when Government control terminated, hardly a week goes by without a number of good sized orders

being closed. Because buying has developed gradually, the extent of railroad purchases is probably not fully appreciated. In the first month of private operation, the Atchison, Topeka & Santa Fe spent over \$18,000,000 for new equipment, which includes 2500 refrigerator cars and 500 gondolas, previously mentioned in this column, and 75 locomotives, also previously mentioned. This expenditure by one road is alone an investment of generous proportions, and indicates that the total purchases to date and those in sight will loom large when translated into dollars and cents. In this connection it should also be borne in mind that large orders for car repairs have been let. Repair shops in this district have already booked sufficient business to keep them busy for months and there is much more work not yet placed. Prominent among recent purchases of new rolling stock is an order for 3000 box cars received by the American Car & Foundry Co., from the Grand Trunk. The Burlington is expected to close this week for the cars mentioned in detail in this column a week ago. The Baltimore & Ohio is inquiring for 1500 box and 600 flat cars. Later reports indicate that the New York Central bought a total of 8000 freight cars, including 4000 box ordered from the American car & Foundry Co., 3500 gondola cars from the Standard Steel Car Co., and 500 gondola cars from the Pressed Steel Car Co. A large order for passenger service cars was also divided between these three builders. The Grand Trunk has ordered 1000 box cars from the Canadian Car & Foundry Co., in addition to 3000 previously mentioned. The Sinclair Refining Co. has bought 500 tank cars from the American Car & Foundry Co. The Western Steel Car & Foundry Co. will build 150 hopper car bodies and repair trucks for the same for the Chicago Great Western. The same car builder will repair 500 steel gondola cars for the Chesapeake & Ohio. The Hocking Valley will let repairs on 1500 freight cars and the Illinois Central is asking for figures on the repair of 1000 steel gondola cars. The Great Northern will have 1000 freight cars repaired.

**Plates.**—The foremost independent expects to open its books for last half business sometime this week. Whether or not orders will be limited to third quarter or will be taken for both quarters has not yet been determined. Whatever may be the company's policy in this regard, the overlap of first half bookings is such as to make it doubtful whether any new business can be rolled before the last month of third quarter. The matter of price has not yet been settled. The leading interest is endeavoring to assist old customers in need of plates and shapes, although it is making no promises as to the time of delivery on orders accepted from those sources. Eastern mills continue to take business in this territory for second and third quarter delivery. One of these producers is selling at 4c., Buffalo, and another at 4c., Pittsburgh. The latter mill recently received an order from a fabricator for 1200 tons, at the same time granting an option for a like tonnage. An inquiry for 20,000 tons of plates, shapes and bars from another fabricator is under consideration.

The mill quotation is 2.65c. to 4c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.17c. for plates out of stock.

**Structural Material.**—Inquiry for shapes, although in good volume, is not as heavy as for plates and bars. The activity of carbuilders and fabricators, however, is expected to prevent any appreciable easing off in demand for some time. The largest new building project of the week is the Masonic Temple, Topeka, Kan., which will involve 2460 tons. Bids on this structure are now being taken. Prominent among recent awards are 1512 tons for additions to the Western Electric Co. plant, Chicago, and 1480 tons for the Federal Reserve Bank, San Francisco, both of them going to the American Bridge Co. Other lettings include:

Chicago, Burlington & Quincy Railroad, six turntables, Chicago, 432 tons, to American Bridge Co.

Pride Pulp & Paper Co., Mohawk, Wis., 103 tons to American Bridge Co.

Current inquiries include:

Griffin Wheel Co., foundry, Council Bluffs, Iowa, 1500 tons.



Wisconsin Steel Works, trestle, South Chicago, 1000 tons.  
Haynes Automobile Co., body works, Kokomo, Ind., 600 tons.

Standard Oil Co., branch warehouse and office building, Milwaukee, 400 tons. Bids taken by A. D. Koch, Milwaukee, architect.

Henry E. Pridmore, foundry building, Chicago, 373 tons.

The mill quotation is 2.45c. to 4c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.97c. for materials out of warehouse.

**Bars**—The leading independent will have some tonnage in mild steel bars to offer its customers when it opens its books this week. It is expected, however, that its capacity will be quickly converted and that consumers will again find themselves without a local source of supply. While soft steel bars are scarce, eastern mills are taking some orders. One recent purchase of 1000 tons of bar products was closed at 4½c. base, Pittsburgh, subject to an extra of ¼c. Bar iron is moving in large volume, much of the tonnage being placed by the railroads. Individual orders by the latter generally range from 800 to 1500 tons and come from numerous lines, including eastern roads, among which are the New York Central, the Pennsylvania, the Erie and the Michigan Central.

The demand for rail carbon steel bars is good and the ruling price is now 3¼c. mill. As the mills can take little new business for delivery before July 1, some inquiries find no takers. Two 500-ton lots of deformed hard steel bars rolled from billets, recently brought 4.07c. Chicago.

Mill prices are: Mild steel bars, 2.35c. to 4.50c., Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.75c.; Chicago; rail carbon, 3.75c., mill. Jobbers quote 3.87c. for steel bars out of warehouse.

**Sheets**—Customers of the leading independent will be able to secure at least a portion of their last half requirements when that mill opens its books this week. No other mills are known to be selling, but reports are current that certain unattached brokers are offering round tonnages for early delivery. Black and blue annealed are said to have been sold through those channels at 9c. and 9½c., Pittsburgh.

Mill quotations are 4.35c. to 6.50c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.75c. to 8.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. The lowest prices are those of March 21.

Jobbers quote, Chicago delivery out of stock No. 10 blue annealed, 6.52c.; No. 28 black, 7.50c.; No. 28 galvanized, 9c.

**Wire Products**—Warehouse accumulations continue to grow, as the result of unsatisfactory car service. The seriousness of the situation is indicated by the fact that one mill recently found it necessary to ship a carload of nails in a fully iced refrigerator car, no other equipment being available. For prices, see finished iron and steel, f.o.b., Pittsburgh, page 1065.

**Rails and Track Supplies**—The leading interest has taken a number of small orders for light standard sections, some of them running up to 500 tons. These emanated from the smaller carriers and lumber roads and will be taken care of on a South Chicago mill which is not equipped to roll heavier rail. A considerable tonnage in track fastenings for indefinite delivery has also been booked recently.

Standard Bessemer rails, \$45 to \$55; open hearth rails, \$47 to \$57. Light rails, 2.45c. f.o.b. makers' mills.

Standard railroad spikes, 3.55c. to 4c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c., f.o.b. makers' mills.

**Cast Iron Pipe**—Current business is confined largely to orders received from industrial sources. Purchases by municipalities are few. Cleveland has awarded 400 tons to the United States Cast Iron Pipe & Foundry Co. The same maker has recently booked a number of orders for 400 or 500 tons from private interests. Pipe foundries are heavily committed in small sizes, but can offer 30 days delivery on large pipe.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$75.80 to \$77.80; 6-in. and above, \$72.80 to \$74.80; class A and gas pipe, \$2 extra.

**Bolts and Nuts**—Owing to unsatisfactory operation, the gap between supply and demand is growing rather than diminishing. During the past week, one maker turned down inquiries for 12,500,000 bolts and nuts.

Another manufacturer rejected a single inquiry for 2,500,000. A prominent interest is accepting specifications from its customers at the rate of about 25 per cent of their normal requirements for mill prices. See Finished Iron and Steel, f.o.b. Pittsburgh, page 1065.

Jobbers quote structural rivets, 5.37c.; boiler rivets, 5.47c.; machine bolts up to ¾ x 4 in., 30 per cent off; larger sizes, 20 off; carriage bolts up to ¾ x 6 in., 20 off; larger sizes, 15 off; hot pressed nuts, square tapped and hexagon tapped, 50c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras are unchanged.

**Old Material**—In the absence of demand the market is sluggish and soft, most prices having declined. Railroad lists are heavy, the largest of which is offered by the Baltimore & Ohio, totalling 20,000 tons, approximately one-half unsorted. The scrap dealers, themselves short of labor, find it difficult to absorb the large amount of mixed scrap which the carriers are putting on the market. Other railroad lists include the Great Northern and the Pennsylvania West, 3000 tons each; the Grand Trunk Western Lines, 1500 tons; the Chicago & Eastern Illinois, 1000 tons; the Pere Marquette, 500 tons; and the Detroit, Toledo & Ironton, 400 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$33.00 to \$34.00
Relaying rails	40.00 to 50.00
Car wheels	37.00 to 38.00
Steel rails, rerolling	32.50 to 33.50
Steel rails, less than 3 ft.	29.00 to 29.50
Heavy melting steel	23.50 to 24.00
Frogs, switches and guards, cut apart	23.50 to 24.00
Shoveling steel	23.00 to 23.50
Low phos. heavy melting steel	23.50 to 29.00
Drop forge flashings	19.00 to 20.00
Per Net Ton	
Iron angles and splice bars	\$31.00 to \$32.00
Steel angle bars	24.00 to 24.50
Iron arch bars and transoms	32.00 to 33.00
Iron car axles	39.00 to 40.00
Steel car axles	32.50 to 33.50
No. 1 busheling	20.50 to 21.50
No. 2 busheling	14.50 to 15.00
Cut forge	24.50 to 25.00
Pipes and flues	18.00 to 18.50
No. 1 railroad wrought	27.00 to 27.50
No. 2 railroad wrought	24.50 to 25.00
Steel knuckles and couplers	23.50 to 24.00
Coil springs	25.00 to 25.50
No. 1 cast	37.00 to 37.50
Boiler punchings	24.00 to 24.50
Locomotive tires, smooth	24.50 to 25.00
Machine shop turnings	13.00 to 13.50
Cast borings	14.00 to 14.50
Stove plate	30.00 to 30.50
Grate bars	30.00 to 30.50
Brake shoes	25.50 to 26.00
Railroad malleable	27.50 to 28.50
Agricultural malleable	26.50 to 27.50
Country mixed	18.00 to 19.00

## Buffalo

BUFFALO, April 6.

**Pig Iron**—On account of a slight easement in the delivery of material already contracted for, there was, during the past week, a somewhat larger commitment of iron than has been the rule for some weeks past. This tonnage was not by any means an excessive one amounting to not more than 10,000 tons, but the fact that it is the largest in some weeks serves to give some indication of about what degree of latitude is obtaining in shipments. The market is very firm with a fair-sized inquiry, but in the last analysis indicating that most of the larger consumers now have their needs fairly well covered for the last half of the year. The market seems to be firmly entrenched now on the \$45 base for No. 2 plain, 1.75 to 2.25 silicon; \$46.25 for No. 2 X, 2.25 to 2.75 silicon, and \$48 for No. 1, 2.75 to 3.25 silicon. So far as can be learned, there have been no departures from these prices for irons of those strict silicon. One interest reports the sale of between 4000 and 5000 tons of foundry of these three grades during the past week. Another reported selling 4000 tons and another a few hundreds of tons. There has been a small tonnage of malleable sold at \$46.25, but the exact amount was not learned. It is now stated that the tonnage of basic sold about three weeks ago in this market at prices of \$41 to \$42 was off-basic. All the sales of foundry iron made were for the last half, principally for last quarter. Shipments keep up in good volume. The car supply is easier and



furnaces are making up for lost time both from strike and other adverse conditions.

We quote f.o.b. Buffalo:	
No. 1 foundry, 2.75 to 3.25 silicon...	\$48.00
No. 2 X foundry, 2.25 to 2.75 silicon...	46.25
No. 2 plain, 1.75 to 2.25 silicon.....	45.00
Basic .....	\$43.00 to 44.00
Malleable .....	46.25
Lake Superior charcoal.....	58.00 to 60.00

**Coke.**—Sales agencies report heavy coke business during the past week. Foundries are rushing to cover needs at prices ranging from \$10 to \$12, Connellsville ovens. Prompt shipment coke is priced \$12 ovens.

**Finished Iron and Steel.**—The situation in its main features is similar to that of last week. Shipments have been made more freely, it is believed, during the past week. This has been due to better weather, improved fuel conditions and a slight improvement in the movement of open cars. The movement of material during March has been very heavy. The demand is heavy for almost all classes of material. Those mills which are accustomed to accepting tonnages for comparatively prompt delivery have not opened their books for third quarter shipment, though it is expected that they will shortly. The leading interest has been accepting some tonnages from old customers where agencies can see their way clear. There is a particularly heavy demand for cold-finished material and tin plate. Prices continue in the same spread and there has been a partial renewal of the premium price. The leading interest is still quoting 2.35c. on bars, 2.45c. on shapes, 2.65c. on plates, while others' prices range from 3.25c. on bars, 3.10c. on shapes and 3.50c. for plates. The smaller mills are still asking 4c. base for these three classes of material. Demand for export goods continues heavy.

Jobbers quote the following prices for this territory: Steel bars, 4.61c.; iron bars, 5.26c.; structurals, 4.46c.; plates, 4.66c.; No. 16 blue annealed sheets, 6.51c.; No. 28 black sheets, 8.25c.; No. 28 galvanized sheets, 9.50c.; bands, 5.81c.; hoops, 6.06c.; cold rolled steel, 6.00c.

**Old Material.**—There is greater activity apparent this week in heavy melting steel and low phosphorus scrap. Some tonnages of heavy melting steel have been sold, including a lot of 2000 tons to a local district mill. This mill, while not exceedingly interested, has been accepting some lots. The price said to have been paid and the price now being offered is \$25. This price does not find the dealers eager to sell. They will not let go of any of their yard tonnages at this price, but will sell mobile lots at this figure. Several sales of high-grade low phosphorus are reported at \$32.50 and there are rumors of a higher price, but these have not been confirmed. Many dealers have had to take back shipments of heavy melting steel which was not strictly up to the specifications, it is reported, and this is serving to make them somewhat more cautious. There is little activity in the other grades.

We quote dealers' asking prices, per gross ton f.o.b. Buffalo, as follows:

Heavy melting steel, regular grades...	\$25.00 to \$26.00
Low phos., 0.04 and under.....	32.00 to 33.00
No. 1 railroad wrought.....	31.00 to 32.00
No. 1 machinery cast.....	38.00 to 39.00
Iron axles .....	40.00
Steel axles .....	41.00 to 42.00
Car wheels .....	37.00 to 38.00
Railroad malleable .....	31.00 to 32.00
Machine-shop turnings .....	16.50 to 17.00
Heavy axle turnings .....	20.00 to 21.00
Clean cast borings.....	17.00 to 18.00
Iron rail .....	30.00 to 31.00
Locomotive grate bars .....	24.00 to 25.00
Stove plate .....	32.00 to 33.00
Wrought pipe .....	21.00 to 22.00
No. 1 busheling .....	20.00 to 21.00
Bundled sheet stamping.....	17.00 to 18.00

Employees of the Eastern Bridge & Structural Co., Worcester, Mass., on April 1 struck when demands for a 25 per cent increase in pay was refused. The plant employs about 150 men, who received from 50c. to 60c. an hour for a nine-hour day.

The International Casket Hardware Co., Thompsonville, Conn., has granted a bonus of 5 per cent of their wages to employees, with the understanding that it may be increased or withdrawn as the officers of the company feel business conditions warrant.

## Birmingham

BIRMINGHAM, ALA., April 6.

**Pig Iron.**—The Birmingham iron market continues to be marked by a variety of prices obtained for the product by different interests. The leading steel company still quotes \$38, the only price at which it has sold this year, and this week again disposed of considerable tonnage on that base. The two largest foundry interests are equally firm for \$42. One of these reports the sale of 2000 tons for Eastern delivery at \$42, and is credited with booking about 10,000 tons on this base during a period of 10 days. The other interest reports booking small lots at \$42. One small concern books small lots at \$43. One Birmingham seller went out of the market at \$40. There is little doubt that large orders on the \$40 basis would find placement in the district with more than one maker. The offering of \$38 metal did not first appear to interest the independents, nor cause a real rattle in the market as long as \$40 base was offered, but as soon as \$42 was asked the sales made at \$38 grew to an extent that did serve to estop large trading at the former level. The outcome for the remaining last half capacity is problematical. Probably one-half of the last half make is still unsold. That is what the price fight will be waged over. The volume of current business is not great. Undoubtedly there will be much less Birmingham iron for the competitive market this summer and autumn owing to the coming in of new Southern pipe works and the steady push to maximum operations at others. There seems no limit in that direction, while the Southern demand for basic metal also grows.

We quote per gross ton, f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, silicon 1.75 to 2.25.....	\$40.00 to \$42.00
Basic .....	39.00 to 41.00
Charcoal .....	55.00

**Cast Iron Pipe.**—The United States Cast Iron Pipe & Foundry Co. has booked an order for 3500 tons of 16-in. for Asheville, N. C., and 500 tons of 14-in. for Monroe, La. It is about to ship 3000 tons of water and gas pipe respectively to Los Angeles and San Francisco via vessel of the Emergency Fleet Corporation from Mobile via the Panama Canal, another ship to make a second trip to the Pacific Coast with similar cargo a month hence. These sailings will be regular, if cargoes are offered. The Anniston plant of the company has completed the installation of machinery to make short lengths of flange pipe for oil well use. The American Cast Iron Pipe Co. is making a tonnage of water pipe for Batavia, Java. Cuba is getting some sanitary pipe and asking for more. The Kilby Frog & Switch Co. has organized the Kilby Pipe & Fittings Co. and will at once build a sanitary pipe shop. Work on two new Anniston shops is under way.

**Coal and Coke.**—Alabama operators accepted the 27 per cent wage advance and announced it effective April 1. Alabama miners wish recognition, but the open shop will continue. Strike is talked, but not anticipated. Output is increasing. Coke has advanced from \$9.50 and \$10.50 to around \$10.50 to 12. Virginia coke offering here has advanced to \$12. The make is eagerly absorbed locally, very little going outside.

**Old Material.**—The deadlock on prices between the consumers and yard men as to heavy steel continues. The yard men want \$3 more per ton, but the small tonnage that is disposed of brings no more than the quoted prices. The yards are holding back hoping for a considerable increase. No. 1 cast and other cast scrap are active.

We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails .....	\$21.00 to \$21.50
No. 1 heavy steel .....	20.00 to 20.50
Cast-iron borings .....	11.00 to 11.50
Machine-shop turnings .....	11.00 to 11.50
Stove plate .....	24.00 to 24.50
No. 1 cast .....	31.00 to 32.00
Car wheels .....	30.00 to 31.00
Tramcar wheels .....	28.00 to 29.00
Steel axles .....	29.00 to 30.00
No. 1 wrought .....	21.00 to 21.50

## Boston

Boston, April 6.

**Pig Iron.**—Approximately 14,000 tons was sold here during the past week. Of this amount four eastern New England consumers took about two-thirds. The price situation is mixed, concessions being made in cases when large tonnages were concerned, while some furnaces have lifted base values. Of the four concerns mentioned, one took 2000 tons Northern charcoal, second half delivery, at \$55, furnace base. Another bought 1500 tons Virginia, silicon 2.75 to 3.25, last half iron, on a \$42 base, and 1500 tons eastern Pennsylvania, silicon 2.25 to 2.75, last half delivery, on a \$44 furnace base. The third concern bought approximately 3100 tons, assorted silicon, with deliveries extending from spot to last quarter, on a furnace base of \$44 for eastern Pennsylvania and Buffalo, and \$42 for Virginia, the latter, amounting to 1000 tons, taken direct from the furnace and not through an agent. The fourth concern bought 150 tons malleable, silicon 1.40 to 1.60, last quarter delivery, at \$48.20 delivered, and about 2000 tons eastern Pennsylvania, silicon 2.75 to 3.25, the phosphorus in one instance being around 0.80 to 1.10 and in another around 0.50 to 0.80, third quarter delivery, at practically \$44 furnace base. Some eastern Pennsylvania interests have advanced the base price from \$45 to \$46, while the Bethlehem Steel Co., which entered the New England market during the past week, has quoted at less than \$45, furnace base, and western Pennsylvania spot No. 1 X resale iron has sold at \$45.50 or \$42.50, furnace base. The Virginia Iron, Coal & Coke Co. has been out of the market since advancing its price from \$42 to \$43, furnace base, but plenty of last half Virginia iron is available in the market at \$42. Prompt shipment Buffalo resale iron has sold at \$44, and last half No. 1 X at \$48.50 or \$45.50 base. A few hundred tons Alabama, silicon 2.25 to 2.75, second quarter iron, sold at \$43.60, or \$42.35 furnace base. Last half Alabama is nominal at \$43 furnace base, consumers not being willing to pay more than \$42. Delivered pig iron prices follow:

East. Penn., silicon, 2.25 to 2.75.....	\$48.15 to \$50.15
East. Penn., silicon, 1.75 to 2.25.....	46.90 to 48.90
Buffalo, silicon, 2.25 to 2.75.....	49.15 to 50.15
Buffalo, silicon, 1.75 to 2.25.....	47.90 to 48.90
Virginia, silicon, 2.25 to 2.75.....	47.95 to 48.95
Virginia, silicon, 1.75 to 2.25.....	46.70 to 47.70
*Alabama, silicon, 2.25 to 2.75.....	49.35 to 50.35
*Alabama, silicon, 1.75 to 2.25.....	47.75 to 48.75

\*Alongside Boston prices.

**Warehouse Business.**—Iron is more plentiful, but steel continues scarce. Prices are very firm and unchanged. Semi-finished and finished case hardened nuts have been advanced, now being list less 40 per cent discount. A serious pinch in the supply of bolts is expected to materialize in the immediate future, and higher prices from the store are anticipated. Machine screws continue scarce. Cap and set screws are higher, the former at 30 per cent discount and set at 35 per cent discount. Two thousand kegs of Canadian wire nails are offered at \$7.35 f.o.b. Boston in carload lots and at \$8.35 in less than car lots. Four thousand kegs are offered at \$6.25 f.o.b. Halifax, N. S. The American Steel & Wire Co. is reported as in a position to make good nail deliveries were freight cars available.

**Jobbers quote:** Soft steel bars, \$5 base per 100 lb.; flats, \$5.50 to \$5.85; concrete bars, \$5 to \$5.50; tire steel, \$6 to \$6.50; spring steel, open hearth, \$10; crucible, \$15; steel bands, \$6.75; steel hoops, \$7.75; toe calk steel, \$6.75; cold rolled steel, \$6.50 to \$7; structural, \$5; plates, \$5.50; No. 10 blue annealed sheets, \$6.55; No. 28 black sheets, \$8.55; No. 28 galvanized sheets, \$10; refined iron, \$5 base; best refined, \$6.50; Wayne, \$7.50; band iron, \$6.75; hoop iron, \$7.75; Norway iron, \$20.

**Finished Iron and Steel.**—Aside from an advance of \$5 per ton to \$3.75 f.o.b. mill on structural by the Bethlehem Steel Co., prices on finished iron and steel remain unchanged. No large structural tonnage was let during the past week, but awards on 1000 tons for a Pawtucket, R. I., mill job, and several smaller jobs are pending. Fabricators are buying small tonnages of universal plates at \$3.75 f.o.b. mill, but comparatively little is being done in the sheared plate market, mills being well sold ahead. One mill, in a position to

practically guarantee deliveries within 90 days, is selling bars, shapes and plates at \$4 f.o.b. mill and higher. Only old standing customers are able to secure third quarter finished iron and steel, and then only in limited amounts. Those New England railroads which have been liberal in shipping permits have temporarily stopped the practice, and the incoming freight situation in this section of the country is as unsatisfactory as at any winter period. For that reason the inactivity of the finished iron and steel market is more pronounced than it was a week ago.

**Coke.**—The New England Coal & Coke Co., has advanced foundry coke \$1.45 a ton to \$15.40 delivered or a \$11 Connellsville base, and its sliding scale contracts to \$10 Connellsville base, in sympathy with the advance in the Connellsville market. Connellsville coke is offered on this market on a \$10 to \$12 oven base. The demand for New England coke product from points outside continues good, and shipments from ovens over Boston & Maine and Boston & Albany railroad lines are satisfactory.

**Old Material.**—Early in the week, No. 1 cast sold heavily to Worcester, Athol, Waltham and other Massachusetts and some New Hampshire foundries on a \$45 to \$46 delivered basis, and several hundred tons of No. 2 cast and carload lots of mixed, the latter at \$3 delivered, changed hands. Since then, however, the demand has slackened and the market appears easier, although not quotably lower. The American Brake Shoe & Foundry Co. continues to buy stove plate on a \$33 to \$34 delivered base, having taken in excess of 1000 tons within the past fortnight or so. Some cast and stove plate has been shipped into New England from New York and Philadelphia. The best price offered for No. 1 heavy melting steel is now \$21, which represents a slight decline in the market since last reports. A Rhode Island horseshoe interest bought 500 tons No. 1 yard wrought for quick delivery at better than \$30 delivered. The two largest consumers of forged scrap have withdrawn from the market, which is easier. Lebanon, Pa., interests continue buyers of wrought pipe. Rerolling rail quotations are largely nominal, none having been offered in the market for several weeks. Railroad malleable is easier on increased offerings. Prices as quoted at the yards follow:

No. 1 heavy melting steel.....	\$20.00 to \$21.30
No. 1 railroad wrought.....	22.50 to 30.50
No. 1 yard wrought.....	25.00 to 26.00
Wrought pipe (1 in. in diameter, over 2 ft. long).....	21.00 to 21.50
Machine shop turnings.....	15.50 to 16.00
Cast iron borings.....	18.00 to 19.00
Heavy axle turnings.....	17.50 to 18.50
Elast furnace borings and turnings.....	15.00 to 15.50
Forged scrap.....	16.50 to 17.00
Bundled skeleton.....	16.50 to 17.00
Street car axles.....	31.00 to 32.00
Car wheels.....	37.50 to 38.50
Machinery cast.....	39.00 to 40.00
No. 2 cast.....	36.00 to 37.00
Stove plate.....	30.00 to 31.00
Railroad malleable.....	28.00 to 29.00
Rerolling rails.....	29.00 to 30.00

## St. Louis

St. Louis, April 6.

**Pig Iron.**—There has been a continuance of the disposition of foundrymen to buy pig iron for prompt delivery and considerable inquiry for last half. The purchases and the inquiries seem to indicate that foundries generally are pretty well filled up with work and that they have contracts ahead which will keep them busy for some time. The sales made during the week were in lots ranging down from 300 tons and the price generally was \$42, Birmingham, for No. 2 Southern. A Southern interest which had been holding out for \$43, Birmingham, reduced its price to \$42, and at that figure made some sales. Consumption generally in this district seems to be very heavy and there is considerable pressure upon furnace to make deliveries promptly and even ahead of time. No. 2 Northern is held at \$46 to \$46.25, Iron-ton, while Chicago iron is entirely out of the market with several consumers usually buying in the Chicago market appearing at St. Louis in search of iron.

**Coke.**—Some few sales of small tonnages of coke have been made in the St. Louis district on the basis of \$10, Connellsville, for contract delivery and \$12 for spot, as well as for April and May. These prices, however, according to notices received by oven representatives here are likely to be withdrawn shortly in favor of higher prices. No Virginia or New River coke is available in this market at any price, and by-product coke from nearby plants is in little better shape.

**Finished Iron and Steel.**—In the finished products market, mill representatives have been busy with the work of cleaning up the first quarter's deliveries and getting matters in shape for the future. Bars are reported in slightly better position, but structural deliveries are much extended, with September delivery about the best, while July is about the best on plates. Some types of bars can be accepted for A No. 1 customers, it is stated, but not any large quantity. The mills have also indicated a willingness to take on a little light rail business for regular customers, but not in large quantity. The prices continue at 2.35c. for structural material, 2.45c. for bars and 2.65c. for plates. In the warehouses there has been much activity with no improvement of moment in the delivery of material.

For stock out of warehouse we quote as follows: Soft steel bars, 3.94c.; iron bars, 4.59c.; structural material, 4.04c.; tank plates, 4.24c.; No. 10 blue annealed sheets, 6.59c.; No. 28 black sheets, cold rolled, one pass, 7.60c.; No. 28 galvanized sheets black sheet gage, 9.10c.

**Old Material.**—The scrap market has continued to soften during the week with no one willing to trade, apparently, as there were no transactions of consequence reported during the week. Both dealers and consumers are continuing to play a waiting game and there is not even a speculative tendency in either direction. Lists out during the week included the Cotton Belt with 300 tons and the St. Louis and San Francisco with 2300 tons.

We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails.....	\$32.50 to \$33.00
Old steel rails, rerolling.....	32.50 to 33.00
Old steel rails, less than 3 ft.....	28.00 to 28.50
Relaying rails, standard sections, subject to inspection.....	50.00 to 55.00
Old car wheels.....	34.50 to 35.00
No. 1 railroad heavy melting steel.....	23.50 to 24.00
Heavy shoveling steel.....	22.00 to 22.50
Ordinary shoveling steel.....	21.50 to 22.00
Frogs, switches and guards, cut apart.....	24.50 to 25.00
Ordinary bundled sheets.....	14.50 to 15.00
Per Net Ton	
Heavy axle and tire turnings.....	17.00 to 17.50
Iron angle bars.....	29.50 to 30.00
Steel angle bars.....	24.00 to 24.50
Iron car axles.....	39.50 to 40.00
Steel car axles.....	33.50 to 34.00
Wrought arch bars and transoms.....	31.00 to 31.50
No. 1 railroad wrought.....	25.50 to 26.00
No. 2 railroad wrought.....	23.50 to 24.00
Railroad springs.....	24.00 to 24.50
Steel couplers and knuckles.....	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside.....	22.50 to 24.00
No. 1 dealers' forge.....	23.00 to 23.50
Cast iron borings.....	15.00 to 15.50
No. 1 bushing.....	22.00 to 22.50
No. 1 boiler, cut to sheets and rings.....	18.50 to 19.00
No. 1 railroad cast.....	35.50 to 36.00
Stove plate and light cast.....	30.50 to 31.00
Railroad malleable.....	26.00 to 26.50
Agricultural malleable.....	25.50 to 26.00
Pipes and flues.....	20.50 to 21.00
Heavy railroad sheet and tank.....	20.00 to 20.50
Railroad grate bars.....	29.50 to 30.00
Machine-shop turnings.....	14.50 to 15.00
Country mixed.....	20.50 to 21.00
Uncut railroad mixed.....	21.00 to 21.50
Horseshoes.....	24.50 to 25.00

The Landis Tool Co., Waynesboro, Pa., will again put into effect its apprenticeship system, which was laid aside when the United States entered the war, according to announcements made by officials. The course will extend over a period of three years of 7800 working hours, with rates of wages ranging from 20 to 50 cents per hour.

The Mount Carmel Iron Works, Mount Carmel, Pa., has filed a voluntary petition in bankruptcy. It is alleged that the company has debts aggregating \$156,334.10, while the assets total only \$75,026.94.

The Gulf States Steel Co. has begun operations at the enlarged bar mill at Alabama City, Ala., and the enlarged wire drawing department will come in soon.

## New York

NEW YORK, April 6.

Moderate buying of pig iron has characterized the last week and prices as a rule are very firm, particularly on Virginia and eastern Pennsylvania iron. There is, however, some irregularity in Buffalo iron and while sales have been made at \$45, \$43 is still quoted and some sales are reported by brokers at even less than \$43, furnace. In eastern Pennsylvania \$44, furnace, now seems to be the lowest quotation and sales have been made at that figure and also at \$45. Full differentials are not always maintained, for while \$45 is paid for No. 2 plain, the price for No. 2 X sometimes is \$47.50, showing a differential of 50c. less than the Government schedule. A sale of 2000 tons of foundry and Bessemer iron has been made for shipment to England and 5000 tons is pending. There are also inquiries from Scandinavia, Italy and Japan. Coke is selling at from \$10 to \$13 for Connellsville foundry grades, the lowest quotation being given to old customers of high standing.

We quote for delivery in New York as follows:

East. Pa., silicon 2.75 to 3.25.....	\$48.05 to \$50.05
East. Pa., silicon 2.25 to 2.75.....	47.05 to 49.05
East. Pa., No. 2 plain, sil. 1.75 to 2.25.....	45.80 to 47.50
Buffalo, silicon 1.75 to 2.25.....	46.90 to 48.90
No. 2 X Virginia, sil. 2.25 to 2.75....	46.40 to 47.40

**Ferroalloys.**—The ferromanganese market is, under the circumstances, unusually quiet but very strong. For prompt and April-May delivery \$250, delivered, has been paid for small lots and in these transactions both American and British alloys have figured. For last half delivery American producers are asking \$200, delivered, and there have been some sales at this level. The amount of British alloy available for any delivery is decidedly limited and the only quantity heard of is a limited amount for shipment from August on for which \$195, seaboard, is the quotation. It is a matter of some surprise that inquiry is not more insistent, but it is the opinion of some that consumers are simply waiting developments and avoiding bidding up the market on themselves. The most interesting transaction is the sale of 250 tons of American alloy for export at \$250. This price is not a delivered price but a price at an American point near the place of production. This sale indicates the difficulty of the consumer in obtaining his usual deliveries of British alloy. The spiegeleisen market is very strong but quiet at \$62, furnace, with demand moderate from both domestic and foreign consumers. Foreign manganese ore of high grade has sold at 80c. per unit, seaboard, and there are inquiries in the market for fairly large amounts by one or two interests who expect soon to produce ferromanganese. The ferrosilicon market is stronger at \$85 to \$90 per ton, delivered with indications in some quarters of a scarcity of the alloy.

**Finished Iron and Steel.**—What change, if any, has taken place in the week lies in a greater willingness among sellers to take larger and therefore more forward bookings at the high prices. In spite of frequent references to the market's having reached the top and that some setback is likely in a matter of months, no actual signs of slackening demand are discernible and prices are firm. Some selling offices report a renewed interest on the part of consumers. Even in plates in which there is an admittedly large producing capacity prices are firm at 4c., Pittsburgh basis. Some export sales in fact have been done at domestic extras, which for plates 1/4 in. in thickness represent an advance of \$8 per ton above what the price would be figured at 4c., base, with the extras normally obtaining on export business. Railroad car buying is slowly developing. The New York Central placed orders for 8000 freight cars and 212 passenger cars and while this is not much over half what was expected, it is believed that the company is not through. The distribution of the cars is as follows: 3500 each to the Standard Steel Car and American Car & Foundry companies and 500 each to the Pressed Steel Car Co. and the Haskell & Barker Car Co.; of the passenger cars 12 will be built by the Pressed Steel Car Co. and 100 each by the Standard



and American companies. The Pennsylvania Railroad is counted on as coming into the market in the early future, while many of the small roads are possibly awaiting the working out of the financial arrangements under which the car business is to be consummated. The Burlington is expected shortly to purchase 1500 cars, equally divided among stock, box and gondolas. The Baltimore & Ohio has asked for alternate bids involving 3100 bodies to use doubtless with existing trucks. The Grand Trunk has placed 3000 box cars with the American Car & Foundry Co. and 1000 with the Canadian Car & Foundry Co. In railroad bridge work there is, however, little before the market nor is much more expected in the early future. The only railroad bridge work contract noted covers 650 tons for the Norfolk & Western, placed with the American Bridge Co. The largest new structural project covers 2500 tons for a Ritz-Carlton hotel at Atlantic City. The awards of important projects are as follows: New Jersey Zinc Co., Palmerton, Pa., 250 tons, to the Guerber Engineering Co.; First National Bank, Jersey City, 1400 tons, to the American Bridge Co.; Robeson Iron Co., 900 tons to the McClintic-Marshall Co.; Glasgow Iron Co., Pottstown, 400 tons, to the Shoemaker Satterthwait Bridge Co.; conservatory for P. S. du Pont, Minden Hall, Pa., 400 tons, to the Belmont Iron Works. The Hay Foundry & Iron Works, which took a 2000-ton telephone exchange structure in New York on East Thirtieth Street, will continue the building upward for several stories taking 1000 tons additional steel.

**High Speed Steel.**—The market shows a slight stiffening, possibly to be attributed to the favorable report on the tungsten bill. With this bill in force and present prices of British high speed steel, it is estimated that the cost of the foreign steel delivered New York would be about \$1.08 per lb. Prices of domestic high speed steel are from \$1.25 to \$1.30 per lb., New York, with a few sales of imported at lower figures.

**Cast-Iron Pipe.**—Orders keep coming in and prices remain firm in spite of the high level which they have reached within the past three months. The making of deliveries is the chief problem with manufacturers. We quote 6-in. and heavier at \$72.30, New York; 4-in., \$75.30, with \$2 additional for Class A and gas pipe.

**Old Material.**—About 10 items have slumped \$1 in price since a week ago, the chief grades involved being rerolling rails, forge fire, yard wrought, stove plate, grate bars, railroad malleable, old car wheels and cast scrap. The recent high level of prices has brought forth considerable quantities of scrap, making a temporary over-supply with an attendant decrease in prices. Neither are consumers buying as freely as usual. Opinion is divided as to whether prices will bound upward or sink to lower levels.

Buying prices per gross ton, New York, follow:	
Heavy melting steel.....	\$20.00 to \$21.00
Rerolling rails.....	31.00 to 32.00
Relaying rails, nominal.....	48.00 to 50.00
Steel car axles.....	34.00 to 35.00
Iron car axles.....	43.50 to 44.00
No. 1 railroad wrought.....	33.00 to 34.00
Wrought iron track.....	22.50 to 23.00
Forge fire.....	17.00 to 17.50
No. 1 yard wrought, long.....	26.00 to 27.00
Light iron.....	10.00 to 11.00
Cast borings (clean).....	18.50 to 19.00
Machine-shop turnings.....	16.00 to 16.50
Mixed borings and turnings.....	15.00 to 15.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long).....	22.00 to 22.50
Stove plate.....	29.50 to 30.00
Locomotive grate bars.....	28.00 to 28.50
Malleable cast (railroad).....	28.50 to 29.00
Old car wheels.....	38.00 to 38.50
Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:	
No. 1 machinery cast.....	\$39.00 to \$40.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	38.00 to 39.00
No. 1 heavy cast, not cupola size.....	30.00 to 31.00
No. 2 cast (radiators, cast boilers, etc.).....	32.00 to 33.00

**Warehouse Business.**—Warehouses continue to suffer from depleted stocks. In many instances jobbers are buying material from one another to fill small orders for prompt delivery. Warehouses have placed as many orders as the mills will take for third quarter delivery, some at a specified price and others subject

to price at time of delivery. One large warehouse interest that has been quoting low has increased its price on structural steel \$10 per ton. An increase is expected on the larger sizes of iron bars to conform with the high prices being paid for the smaller sizes. Quotations on copper sheets and brass rods and tubing are nominal as warehouse stocks are low and many mills are having strikes for 25 to 33 1/3 per cent pay increases and 10 per cent reduction in hours. We quote prices on page 1086.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.77c.; shapes, 2.72c. to 4.27c.; plates, 2.92c. to 4.77c., the minimum prices being for indefinite delivery and the higher prices for the second quarter; bar iron, flats, wider than 6 in., 4.57c.; 3/4 and 7/16 in., round and square, 5.27c.; light rounds, squares and flats, 5.77c., and other sizes, 4.27c.

## Cleveland

CLEVELAND, April 6.

**Iron Ore.**—Ore on Lake Erie docks April 1 amounted to 7,534,406 gross tons as compared with 6,505,057 tons on the same date a year ago. Shipments from docks to furnaces during March were 1,480,972 tons as compared with 1,208,002 tons during the corresponding month last year, and with 645,000 tons during February this year. Ore firms have plenty of shipping orders but the car shortage is still interfering with shipments. Although there were over 1,000,000 tons more of ore on the docks on April 1 than a year ago, stocks in furnace yards are generally low, so that the combined stocks in the furnace yards and on docks are considerably less than on April 1 last year, and many furnaces are anxious to secure liberal shipments from the docks before navigation gets well under way. Ore firms expect to begin lake shipments of ore by April 20, and possibly a few days earlier. The ice in Lake Superior is rapidly breaking and it is believed that boats will be able to get through not later than the later date. With the large amount of ore sold, the ore movement probably will be fairly heavy from the start as compared with the slow early movement last year, due to the fact that buying a year ago did not start until after the opening of the season of navigation. Estimates for the season's movement range from 60,000,000 to 62,000,000 tons. It is the general opinion in the ore trade that the car supply at the lower lake ports will be an important factor in the movement during the coming season, and that the maximum shipments will be limited by the ability of the railroads to move ore from the lower lakes to the furnaces. There is practically no activity in the market at present.

We quote, delivered, lower Lake ports: Old range Bessemer, \$7.45; old range non-Bessemer, \$6.70; Mesaba Bessemer, \$7.20; Mesaba non-Bessemer, \$6.55.

**Pig Iron.**—The pig iron market is quiet, but prices are firm and the \$42 price that has recently been quoted by two or more northern Ohio sellers has apparently disappeared. One interest advanced its Valley price to \$43, and after taking on some business at the advance, withdrew from the market because of the uncertainty about the coke price situation. The high price of furnace coke is apparently having some effect in stiffening pig iron prices, although the advance in coke was discounted some time ago, when furnaces named last half price for pig iron, the general feeling being then that furnace coke would reach \$10 with the removal of Government restriction. The Westinghouse Air Brake Co. has purchased 4000 tons of pig iron from a Valley furnace for the third quarter delivery, 1000 tons each of No. 2 at \$43, No. 2 X at \$44.25, No. 3 at \$42.50, and malleable at \$43. A northern Ohio furnace has taken 1200 tons of malleable iron for the last half at \$43.50, an advance of 50c. over recent quotations. A sale of 150 tons of malleable was made at the same price for last quarter delivery by a western Pennsylvania furnace for shipment to Boston. Locally a few small lot sales of foundry iron are reported at \$43 for the last half delivery. Prompt shipment sales are still being made by outside furnaces at \$44. Ohio silvery iron is very firm and sales are being made at higher than regular price of \$55 for 8 per cent. We note a sale of one lot of 200 tons of 7 per cent silvery for last half at

\$56 or on a basis of \$58. Foundries are crowding furnaces for shipments and some are asking that shipments be anticipated, being desirous of getting deliveries on their last half iron during the third quarter.

We quote, delivered Cleveland, as follows, based on 40c. switching charge for local iron, a \$1.40 freight rate from Valley points and \$5 from Birmingham:

Basic .....	\$43.40
Northern No. 2 foundry, sil. 1.75 to 2.25 .....	43.40
Southern foundry, sil. 2.25 to 2.75 .....	\$46.25 to 49.70
Gray forge .....	41.40
Ohio silvery, sil. 8 per cent .....	58.40 to 61.40
Standard low phos., Valley furnace ..	48.00 to 50.00

**Coke.**—Considerable activity has developed in foundry coke following the removal of the Government restrictions. The most general quotation is \$12 for standard Connellsville foundry coke for prompt shipment, although a \$11 price is reported and sales have been made as high as \$13 and \$13.50. Some producers are covering present consumers with last half contracts at \$10 for the same tonnage they had under contract for the first half, but are charging \$12 for any additional tonnage and are also taking on new customers at \$12 for second quarter and last half. Considerable business is being placed in contracts at \$10 and some consumers are placing contracts at the \$12 price. A clause in the contract provides an advance covering increased costs of production should miners' wages be advanced. We note the sale of 1000 tons of standard furnace coke at \$11 for prompt shipment, although as high as \$12 is being asked.

**Finished Iron and Steel.**—An easing up in new demand for finished iron and steel for early shipment is noticeable. This applies to most finished lines except sheets. With better mill production, consumers are not so hard pressed for material as a few weeks ago. Although the car shortage is delaying deliveries, consumers are no longer experiencing the difficulty they had for some time in placing orders, for if one mill cannot take the tonnage offered, another can. Several mills able to make fair deliveries are still quoting steel bars, plates and structural material at 4c. One Eastern mill is now offering small angles at 3.75c. to 4c. Another mill is now quoting structural material at 4.25c. Cold-rolled steel bars and wire are still scarce and consumers are trying to place contracts for extended deliveries. Bessemer wire rods are still in demand at \$80 and we note a sale of 1500 tons at that price. The Lima Locomotive Corporation has taken 82 switch engines for the New York Central Railroad requiring 4000 tons of steel which has been placed. Structural work continues rather quiet and there is a spread of about \$40 per ton on fabricated work due largely to the wide range in prices on plain material. The American Bridge Co. has taken 1000 tons for the addition to the Plain Dealer Building, Cleveland; the Canton Bridge Co. has taken 350 tons for the buildings of the Louisville Sheet Steel Co., Louisville, Ohio, and the Moss Iron Co., Wheeling, W. Va., 200 tons for a factory building for the Aetna Realty Co., Cleveland. The sheet situation shows no easing up and some consumers are trying to place last half contracts for larger quantities than they purchased in the first half. Some automobile builders have been forced to use one pass black sheets for full finished sheets for automobile bodies. Independent mills are quoting black sheets at 6.50c. to 7c. and blue annealed at 6c. to 6.50c., but prices are still reported as high as 9½c. for black sheets for prompt shipment.

Cleveland warehouses quote steel bars at 3.27c. to 5c.; plates 3.57c. to 5c.; and structural material 3.70c. to 5.10c.

**Bolts, Nuts and Rivets.**—The demand for bolts and nuts is very heavy in specifications on contracts and in new business. Railroads are buying freely. Bolt makers are taking railroad contracts for the second quarter, but are not generally booking contracts for the entire second quarter with either consumers or jobbers. Two or three central Western manufacturers have advanced prices on small machine bolts with rolled threads 5 to 10 per cent, but the advance is not general. Jobbers advanced prices April 1 because they must pay manufacturers higher prices with the expiration of the first quarter contracts. Rivets continue in heavy de-

mand, but production is curtailed by lack of steel and inefficient labor, so that some makers are able to get up to only 70 per cent of normal production.

**Old Material.**—The scrap market is weaker, particularly on steel-making grades. Heavy melting steel, borings and blast furnace turnings are down \$1 a ton, and sharp declines have been made on some other grades. The supply of scrap is plentiful, but only a limited amount is moving, as few mills are in the market. Railroad offerings are fairly heavy. Sales of heavy melting steel to Valley mills are reported \$25.50 to \$26, but some of the mills now are not offering over \$25 for this grade. In Cleveland heavy melting steel has sold down to \$24.50. Valley mills are paying around \$19 for borings. Local mills still have good-sized stocks of scrap and with one exception are out of the market. Busheling is a drug on the market and very weak.

We quote, per gross ton delivered consumers' yards in Cleveland and vicinity, as follows:

Heavy melting steel .....	\$24.50 to \$25.00
Steel rails, under 3 ft. ....	27.25 to 27.75
Steel rails, re-rolling .....	31.00 to 32.00
Iron rails .....	32.00 to 33.00
Iron car axles .....	41.00 to 42.00
Steel car axles .....	36.00 to 37.00
Low phos. melting scrap .....	27.00 to 27.50
Cast borings .....	17.25 to 17.50
Iron and steel turnings and drillings ..	15.00 to 15.50
Short turnings for blast furnaces ..	17.00 to 17.50
Compressed steel .....	21.00 to 21.75
Railroad wrought .....	28.00 to 29.00
Railroad malleable .....	32.00 to 32.50
Agricultural malleable .....	27.00 to 28.00
Steel axle turnings .....	21.00 to 21.75
Light bundle sheet scrap .....	17.00 to 17.50
No. 1 cast .....	39.00 to 40.00
No. 1 busheling .....	20.00 to 21.00
Drop forge flashings, over 19 in. ....	17.85 to 18.25
Railroad grate bars .....	30.00 to 31.00
Stove plate .....	30.00 to 31.00

## Cincinnati

CINCINNATI, April 6.

**Pig Iron.**—The pig iron market remains dull, sales during the week consisting mostly of off-grade iron, there being little standard iron disposed of. While inquiry is light, there are indications of increased interest on the part of buyers who are not covered beyond the first half, and sellers confidentially expect a buying movement to set in before long. There is a good market for southern Ohio basic, and one interest reports that it would have no difficulty selling a fair-sized tonnage if the iron were available. Prices are firm at the levels prevailing last week, though reports are being circulated that some furnaces are quietly offering iron at prices below the market, one instance being noted of a sale of 1200 tons of malleable by a southern Ohio furnace for last half shipment at \$43, furnace. We note a sale of 1800 tons of Southern foundry iron, silicon 2.25 to 2.75, manganese over one per cent, to an Indiana melter for delivery during the next six months at \$46.25, Birmingham. We also note a sale of 1000 tons of basic at \$43, Valley furnace. Southern iron is still being quoted at \$40 to \$42, and southern Ohio \$43 to \$45. At least two silvery furnaces in southern Ohio are now quoting 8 per cent silvery at \$58, furnace, but others are still holding to the \$55 price.

Based on freight rates of \$3.60 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price) .....	\$43.60 to \$45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft) .....	44.85 to 46.85
Ohio silvery, 8 per cent sil. ....	56.80
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2) .....	44.80 to 46.80
Basic Northern .....	41.80
Malleable .....	46.80

**Finished Material.**—Demand for finished products still keeps up, and pressure is being brought to bear on mills to accept orders for the third quarter. So far as known, none of this business has been placed. Inquiry is particularly heavy for light sheets for forward delivery, though there has been a decided falling off in the feverish anxiety to have business placed regardless of price. The demand for iron and steel bars is also good, but structural inquiry is reported as light.

No improvement is noted in delivery of wire nails, and independent mills are still quoting around \$7 per keg base. Sheets are being quoted at 5c. for No. 10 blue annealed, 6c. for No. 28 black and 7.25c. for galvanized. These are prices at which business has been recently taken by mills catering to the wants of consumers in this territory. The finer weather now prevailing is expected to relieve the car shortage to a considerable extent, and warehouses are hopeful that they will be able to get some of their shipments, now held up at mills, through to their customers.

**Coke.**—Spot coke continues in heavy demand and in one instance at least \$13.50 has been paid for Connells-ville foundry on a small tonnage, and \$15 is predicted before the end of the week. Some operators in the Connellsville field are offering foundry coke for shipment over the next six months at \$10, ovens, and a number of contracts have been made at this figure. New River coke is being quoted at \$13, and Wise county at \$11.50. We note a sale of 120,000 tons of 48-hr. Wise County coke to a Chicago consumer, delivery to be at the rate of 10,000 tons a month commencing June 1. The price named is \$10 at ovens, with provision made in the contract for adjustment in case labor costs change during the life of the contract.

**Old Material.**—The scrap market is dull, and prices on some lines have dropped during the week. This applies more particularly to cast borings, steel turnings and heavy melting steel, which are off about 50c. per ton. Considerable inquiry has developed for re-laying rails and this item is now quoted at \$50 to \$51. Dealers are not pushing sales and are content to mark time, feeling that the expected buying movement cannot now be long delayed. Machine tool houses which have accumulated some cast scrap are disposing of it direct to foundries at around \$38 per net ton. We quote:

We quote as follows:

	Per Gross Ton
Bundled sheet	\$16.00 to \$17.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	50.00 to 51.00
Re-rolling steel rails	30.00 to 31.00
Heavy melting steel	21.50 to 22.50
Steel rails for melting	24.00 to 25.00
Car wheels	29.00 to 30.00
	Per Net Ton
No. 1 railroad wrought	\$26.00 to \$27.00
Cast borings	13.50 to 14.00
Steel turnings	11.50 to 12.00
Railroad cast	31.00 to 32.00
No. 1 machinery	35.00 to 36.00
Burnt scrap	22.00 to 23.00
Iron axles	29.50 to 30.00
Locomotive tire (smooth inside)	23.50 to 24.50
Pipes and flues	17.00 to 17.50
Malleable cast	23.00 to 23.50
Railroad tank and sheet	16.00 to 16.50

## Philadelphia

PHILADELPHIA, April 6.

The fuel situation still is of dominating importance in its effect both on production and prices of pig iron and steel. As to production, an increase may be expected as soon as coal and coke become more plentiful. For example, an Eastern steel company will put on several more open hearth furnaces as soon as a coal supply is assured. With additional steel-making capacity in operation, this company will require more basic pig iron and may purchase a large block very soon for delivery in second and third quarters. Prices of both coal and coke have advanced considerably since the removal of Government control on April 1, and if these high prices continue for any length of time, they will be reflected in higher pig iron prices, while steel products may also be affected. Blast furnace and foundry coke is selling at from \$10 to \$12 a ton, ovens, with as high as \$14 having been quoted on foundry grade. Blast furnaces are loath to contract at this high level, but a considerable number of contracts with foundries have been closed for last half at \$12. Coal and coke prices have gone so high that the Government is again taking cognizance of the situation, and, according to the Washington correspondent of a Philadelphia newspaper, will put prices under control once more if they are not kept in check.

The markets are quiet. With some exceptions, the inquiry for steel products is not large considering the conditions of scarcity generally reported by consumers. Pig iron demand is only fair and is confined largely to foundry grades. The scrap market is dull and prices are lower.

**Pig Iron.**—The demand for basic pig iron has been relatively small for some weeks, but an eastern consumer is expected to come into the market shortly for a large block to cover second and third quarter needs. Makers will probably quote at about \$42, furnace. The Reading Iron Co. is inquiring for 10,000 to 15,000 tons of gray forge iron for last half. Recent sales were on the basis of \$42, furnace. The demand for low phosphorus iron is not large, but sales of small tonnages have been made at \$50 for the copper free and \$47 for the copper bearing, f.o.b. furnace. A fairly large number of sales of foundry iron for second half are being made, but the tonnages involved are mostly small. Some consumers appear apprehensive about covering so far ahead at prevailing high prices. Iron prices are firm and a few furnaces have made advances within the past week. A western Pennsylvania furnace, which has been quoting \$42, furnace, on No. 2 plain and \$43.25 on No. 2 X, with regular differentials for higher silicon, has put up its prices \$1 a ton. So far as reported, all of the Virginia furnaces, with one exception, are quoting on the basis of \$43, furnace. One furnace quotes on the basis of \$42.25, furnace, but has nothing to offer for delivery in first half. If coke continues at the present high prices, further advances in pig iron prices are not unlikely. One furnace company is now considering going to the basis of \$46, furnace, for second half, an advance of \$1.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2 X, 2.25 to 2.75 sil.	\$47.05 to \$47.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	45.80 to 46.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	47.10
Virginia No. 2 X, 2.25 to 2.75 sil.	48.35
Basic deliv. Eastern Pa.	44.80
Gray forge	43.00
Standard low phos. (f.o.b. furnace)	50.00
Malleable	46.75
Copper bearing low phos. (f.o.b. furnace)	47.00

**Ferroalloys.**—Carload lots of ferromanganese for spot delivery have been sold at \$250, delivered. No sales at \$200 for second half, the price which domestic makers quote, are reported. One British agent quotes the imported alloy for second half at \$195, seaboard. A better inquiry for spiegeleisen is noted. One eastern maker quotes \$62, furnace.

**Coke.**—Although sales of blast furnace and foundry coke have been made since April 1 at \$10 to \$12, ovens, as high as \$14 has been asked, but no sales are reported at the high figure. One coke manufacturer has made contracts with a considerable number of its foundry customers for second half at \$10, ovens, but will take at this price only the same quantity that the first half contracts called for. Customers wanting a quantity in excess of the amount bought in first half are required to pay \$12 for the additional tonnage. Operators of blast furnaces are somewhat concerned over the high prices, as they say still higher prices of pig iron will be necessary if they are obliged to contract for coke at \$10 to \$12. Some conservative sellers believe that iron prices have already gone too high for safety.

**Semi-Finished Steel.**—A better supply of billets is noted, one Eastern producer offering 3000 tons a month of open-hearth re-rolling billets at \$65, Pittsburgh. Another company quotes \$60 on billets, but is limiting sales to its regular trade. There are good-sized inquiries for forging billets in the market, particularly from the railroads, but these are somewhat more difficult to place with mills than re-rolling quality. Efforts to buy sheet bars in the East have been generally unavailing, and the same is true of skelp. An Eastern plate mill has turned down a proffered order for 14,000 tons of skelp. Mills quote open-hearth re-rolling billets at \$60 to \$65, Pittsburgh, with a \$4.10 freight rate, and forging billets at \$70 to \$85, Pittsburgh.

**Plates.**—The demand for plates is still fairly good



and mills find it easy to obtain 4c., Pittsburgh, when good deliveries can be made. One Eastern mill can ship in 60 to 90 days, but some are well sold up for second quarter. Railroads are urging the plate mills to accept second quarter specifications. The Pennsylvania Railroad is in the market for 4000 to 8000 tons of steel for second half, which includes 1000 to 2000 tons of car repair material and 1000 to 2000 tons of boiler and firebox steel. Production of plates in the East is at a good rate, and will be improved if a better coal supply can be obtained. One large plate manufacturer will put on several more open-hearth furnaces as soon as a sufficient supply of gas coal is assured. A Pittsburgh mill is reported to have taken a tonnage of ship plates for a Pacific Coast shipyard at 2.65c., Pittsburgh, but in the East the market is pretty firmly on the basis of 4c.

**Structural Material.**—The demand for shapes for building work is not large, owing to the abandonment of many building projects because of high costs and the difficulty of getting material. Fabricators are having trouble in obtaining sufficient steel for work on hand. One small tonnage of shapes was sold for delivery in three weeks, but this is exceptional. Production shows some improvement. The Midvale Steel & Ordnance Co. has placed 500 tons of shapes with another independent mill for ore bins at Coatesville, Pa. The Pennsylvania Railroad has an inquiry out for 1000 to 2000 tons of shapes for second half. Eastern shape mills are getting 4c., Pittsburgh, on such business as they are accepting.

**Bars.**—One Eastern maker of bars is sold up for six months. Another has taken sufficient specific business and contracts to take up its capacity until July 1, and has turned down sufficient business to fill up its mills until the end of the year. The scarcity of small bars is not relieved. Some efforts have been made to contract with rerolling mills for the rolling of bars from billets, but the conversion charges quoted ranged from \$40 to \$50 a ton, so nothing has been done. Prices quoted on soft steel bars range from 4c. to 4.50c., Pittsburgh. An Eastern company has sold 1000 tons of spring steel to a Chicago consumer at 4.75c., Pittsburgh, and the same price has been quoted on another 1000 tons wanted by a Cincinnati consumer. The Pennsylvania Railroad is inquiring for 1000 to 2000 tons of bars for second half.

**Sheets.**—The Bethlehem Steel Co. will begin operation of its 10 new sheet mills at Sparrows Point, Md., in July and expects to begin shipping sheets in September. The monthly output will be from 8000 to 10,000 tons of blue annealed, black and galvanized. Blue annealed sheets are being sold for second quarter at 5c. to 5.25c., Pittsburgh, but a Youngstown mill wants \$20 a ton or more above this price on a small tonnage. Black and galvanized sheets are exceedingly difficult to obtain.

**Old Material.**—The scrap market is weak and prices are lower. Consumers are buying only small lots. We quote for delivery at consumers' works in this district as follows:

No. 1 heavy melting steel.....	\$24.50 to \$25.00
Steel rails rerolling.....	33.00 to 34.00
No. 1 low phos., heavy 0.04 and under	31.00 to 32.00
Car wheels.....	40.00 to 41.00
No. 1 railroad wrought.....	35.00 to 37.00
No. 1 yard wrought.....	29.00 to 30.00
No. 1 forge fire.....	20.50 to 21.00
Bundled skeleton.....	20.50 to 21.00
No. 1 busheling.....	24.00 to 25.00
No. 2 busheling.....	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use).....	18.00 to 19.00
Mixed borings and turnings (for blast furnace use).....	17.50 to 18.50
Machine-shop turnings (for rolling mill and steel works use).....	19.00 to 20.00
Heavy axle turnings (or equivalent)	21.00 to 22.00
Cast borings (for rolling mills).....	20.00 to 21.00
Cast borings (for chemical plant).....	24.00 to 25.00
No. 1 cast.....	38.00 to 40.00
Railroad grate bars.....	31.00 to 32.00
Stove plate.....	30.00 to 31.00
Railroad malleable.....	30.00 to 31.00
Wrought iron and soft steel pipes and tubes (new specifications).....	25.00 to 25.50
Iron car axles.....	45.00 to 46.00
Steel car axles.....	42.00 to 44.00

## British Iron and Steel Market

Easter Holiday Quiet—Prices Firm and Likely Higher—Coke Exports Prohibited

(By Cable)

LONDON, ENGLAND, April 7.

The pig iron market is quiet, owing to the Easter holidays. Prices are unaltered, but advances are expected shortly as a result of the demands for increased wages by coal and iron miners. The hematite iron situation is a little easier, makers considering orders for May and June delivery. A small amount is expected to be available for export.

Bilbao-Middlesbrough freight rates are slackening, but prices on ore from Spain may increase.

Coke continues scarce. Exports are entirely prohibited.

Tin plates are firm; galvanized sheets are steady.

We quote per gross ton, except when otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4 for £1, as follows:

	£	s.	£	s.	
Ship plates.....	25	0 to 30	0		\$100.00 to \$120.00
Boiler plates.....	28	10 to 33	0		112.00 to 132.00
Tees.....	25	10 to 32	0		102.00 to 128.00
Channels.....	24	15 to 31	5		99.00 to 125.00
Beams.....	24	10 to 30	0		98.00 to 120.00
Round bars, ¾ to 3 in.....	27	0 to 32	10		108.00 to 130.00
Rails, 60 lb. and up.....	21	0 to 22	0		84.00 to 88.00
Billets.....	24	0 to 25	0		96.00 to 100.00
Sheet and tin plate bars,					
Welsh.....	30	0 to 35	0		120.00 to 140.00
Galvanized sheet, 24 g.....	56	0 to 58	0		224.00 to 232.00
Tin plate, base box.....	3	11 to 3	17		14.20 to 15.40
Steel hoops.....	34	15 to 35	0		139.00 to 140.00
Cleveland basic iron.....	10	10			42.00
West Coast hematite.....	13	5			53.00
Cleveland No. 3 foundry (export to allies).....	10	5			41.00
Ferromanganese.....	35	0 to 40	0		140.00 to 160.00

## Rails and Track Fastenings Sold by the Government

WASHINGTON, April 5.—Prices ranging from \$26.89 to \$63.50 for odd lots of special size steel rails were obtained by the War Department, according to an announcement of awards on surplus for which bids were received up to March 29. Included in the rail and track materials sold were 1333 gross tons of 67.53 lb. Russian rail in standard lengths, 1091 gross tons of 35 lb. A. S. C. E. rail in 15-ft. lengths, 1101 gross tons of 30 lb. A. S. C. E. rail in 26-ft. lengths, 2946 gross tons of 25 lb. A. S. C. E. rail in 8, 10 and 12-ft. lengths, splice bars, track bolts and nuts and spikes, tie plates, rail braces and re-railers.

The awards follow:

Material Advertised	Award	Price	Purchaser
1333 gross tons Russian rail	1333 gross tons	\$53.15 gross tons	J. Natwick & Co., 725 Munsey Building, Baltimore
1091 gross tons 35 lb. rail	1091 gross tons	\$36 gross tons	M.K. Frank, Frick Bldg., Pittsburgh
1101 gross tons 30 lb. rail	1101 gross tons	\$63.50 gross tons	J. Natwick & Co., 725 Munsey Bldg., Baltimore
2946 gross tons 25 lb. rail	49 gross tons	\$36.50 gross tons	The Frog Switch & Mfg. Co., Carlisle, Pa.
	2897 gross tons	\$26.89 gross tons	J. G. Williams Co., 200 Fifth Ave., New York
86,900 pairs 80 lb. splice bars	86,900 pairs	\$29.50 gross ton	M. K. Frank, Frick Bldg., Pittsburgh
26,728 pairs Russian rail splice bars	4000 pairs	\$1.15 per pr.	J. Natwick & Co., 725 Munsey Bldg., Baltimore
3500 pairs 50 lb. splice bars	3500 pairs	\$60 gross tons	M.K. Frank, Frick Bldg., Pittsburgh
4029 kegs track bolts ¾ in. x 4¼ in.	4029 kegs	\$3.90 cwt.	Hyman - Michaels Co., Peoples Gas Bldg., Chicago
745 boxes track bolts for Russian rail	200 boxes	\$3.40 cwt.	J. Natwick & Co., 725 Munsey Bldg., Baltimore
625 kegs track spikes ½ in. x 5 in.	625 kegs	\$3.45 cwt.	J. Natwick & Co., 725 Munsey Bldg., Baltimore
152,988 pieces rail braces	152,988 pieces	\$2.50 cwt.	M. K. Frank, Frick Bldg., Pittsburgh
75,560 pieces tie plates	75,560 pieces	\$2.50 cwt.	M. K. Frank, Frick Bldg., Pittsburgh
Railway crossings	Rejected		
3200 re-railers	3200 re-railers	\$41.22 gross tons	J. G. Williams Co., 200 Fifth Ave., New York

## WRONGS IN INDUSTRY\*

### The Little Heed Given to "Soldiering" of Equipment

BY WALTER N. POLAKOV

**I**N his quest for harmonizing the industrial relations, Dr. Fred W. Taylor laid greatest emphasis on the "elimination of soldiering" which would lower cost of production, insure higher wages and make shorter working hours and better working and home conditions possible. Maximum prosperity for both parties of controversy in his opinion can exist only as the result of the determined effort of each workman to turn out each day his largest possible day's work.

After 20 years of determined efforts on the part of a large number of industrial engineers of all descriptions and in nearly every country of the world, neither the expected prosperity nor consequent industrial peace makes itself anywhere manifest. Reasons for this failure can be ascribed neither to opposition of some labor groups to the use of the stop watch nor to the lack of appreciation on the part of employers of advantages existing in the so-called scientific management. Indeed, there is a fairly large number of industrial establishments to-day that practice the Taylor system, yet the reason why our industries as a whole did not get anywhere toward solving the problem of industrial relations is that it was sought in the wrong direction. One wonders that for over 20 years the forest was not seen behind the trees.

#### Productivity Yields to the Dollar

The trouble was hinted at by H. R. Towne, who naively said "The dollar is the final term in almost every equation which arises in the practice of engineering in any of its branches, except qualifiedly as to military or naval engineering, where in some cases cost may be ignored." And also: "Industrial engineering, of which shop management is an integral and vital part, implies not merely the making of a given product, but the making of that product at the lowest cost consistent with the maintenance of the intended standard of quality."

Dollars and cost thus obscured all other considerations such as service to society, welfare of the community, maintenance of standard living, education and decency—the only qualifier being quality of the product and the only exception, military necessity. The disintegration of productive forces within a society was neglected for the sake of the dollar. The late H. L. Gantt summed up the situation in these terse words: "The aim of our efficiency has not been to produce goods, but to harvest dollars. If we could harvest more dollars by producing fewer goods, we produced fewer goods."

#### Increased Productivity Often "Corrected"

So long as our industry is conducted individually and on a competitive basis, success in business means securing larger profits. Increased production, by supplying more than the limited buying ability of a population can consume, tends to lower the profits. Hence the increased productivity is avoided and whenever apparent is "corrected" by withholding the goods from the market by means of so called "cornering," hoarding, or even direct limitation of output and refusal to book orders at less attractive prices. Under such an economic regime a peculiar inconsistency developed in the treatment of idle producers and idle means of production.

If a worker is "soldiering," the management of "initiative and incentive" as well as the "task management" exerts efforts to stimulate the productivity of individual workers until it measures up to expectation. It creates therefore an alternative before a worker: either to increase individual efficiency and make a fellow worker superfluous, or to be laid off himself. The

manufacturer, on the other hand, is benefited by increased production of the men in his employ provided the productivity of his competitors and of the whole industry do not increase faster than the prices may be adjusted to safeguard his profits. If under the circumstances he finds it more profitable to limit his own production he lays off excessive workers, still demanding high productivity from the remaining men.

#### Laid-Off Men Are Now No Burden

The laid-off men receive no wages and are no longer a direct concern to their former employer; the laid-off machines, however, continue to draw the payments for rent of space they occupy, for interest, depreciation, insurance, etc. While in this manner idle men are not burdens to manufacturers, idle machines cause a material burden. This expense of maintaining idle plant is in turn unloaded by the manufacturer upon the shoulders of consumers inasmuch as the idle overhead is prorated over the limited output of the part of the plant remaining in operation. In my paper before the American Society of Mechanical Engineers in 1916 on "Valuation of Industrial Methods" I said: "Present practice manifestly tends to charge against the cost of a product the cost of overequipment and mismanagement, thus imposing on society the penalty for tolerating these conditions in the industries."

In nearly every industry the overhead charges are higher than the payroll; fixed charges on a \$10,000 machine are twice as large as the wages of its attendant; in blast furnaces the overhead was over \$90,000,000 while wages were \$22,780,000; in steel mills overhead exceeded \$250,000,000 while wages were \$188,142,000; in central stations the overhead of \$440,000,000 corresponded to only \$36,800,000 paid in wages. (Above data are from the last United States censuses.)

The importance of having the equipment perform its productivity work is far greater than further increasing the efficiency of individual workers. The significance of the burden imposed on society and the drain on economic resources of the country by neglect of using the existing productive capacity may be illustrated by a few typical cases. In the coal industry 30 per cent of productive capacity of mines remains constantly idle. In the blast furnace industry 40 per cent of productive capacity was idle during the last 11 years at an average annual expense of \$79,200,000 of which \$49,500,000 was avoidable, i. e., not caused by repairs, relinings, etc. In a typical central station supplying electric power to a railroad, annual idle expense averaged \$60,000.

#### Idle Plant Not Entitled to Reward

If on the basis of equity, we adopt the principle that the idle capital represented in idle plant and equipment is not entitled to any return or reward, the same as idle labor, we will establish thereby a principle of fair play. This practice will put a stop to rewarding idleness and will stimulate the industry to render to the country the most needed service.

The problem was successfully approached during the war time in so far as production and importation of necessary commodities were scheduled. The quantity of each was estimated and the time of delivery determined. Any shortage or excess was at once apparent and activities coordinated accordingly. This method, as tried out with gratifying results, was used by the Air-Craft Production, Emergency Fleet Corporation, United States Shipping Board, Ordnance Department and a number of private concerns.

Similar scheduling of peace-time requirements will eliminate uncertainty of guessing the demand from the price fluctuations, will reduce idleness, stimulate productive use of equipment and establish a competition on the basis of lowering the cost of production instead of by limiting the productivity in order to inflate prices above the cost of idleness and mismanagement.

By eliminating in a measure idleness of machines and capital, we won the war. Let us apply the same principle in peace time and make men dear and commodities cheap.

\*A paper substantially in full presented before the Society of Industrial Engineers at Philadelphia March 26. The author is a consulting engineer, New York.

# American Trade Prospects in China

## Undeveloped Industrial Resources in the Interior—Establishing the Branch Office—Need of Analyzing Field

**A** VERY substantial development of business in China in steel, machinery and similar products is predicted by J. Edmund Good, general purchasing agent the American Steel Export Co., 233 Broadway, New York, who returned recently from an extended investigation of trade conditions in the Far East. He emphasized the almost virgin character of China industrially, development so far having been confined largely to cities along the coast. In an interview with a representative of THE IRON AGE, he pointed out that the industrial growth of China depends primarily upon the development of modern transportation systems. A valuable groundwork of goodwill toward business men from this country has been built up, he stated, from the friendly American political attitude toward China, and American exporters will share this business to the extent they are able to compete with European houses. He analyzed the situation as follows:

There has been heavy buying for the last year or so, not so much because consumption has increased, but because exchange has been going in her favor to such an extent that she can afford to take chances in buying for some time ahead. With big stocks of most commodities on hand and with large orders placed for future delivery, she is close to an over-bought condition. The high rate of exchange has acted adversely on exports from China, so that to-day she is selling very little. She cannot indefinitely keep on buying without selling.

### The Primitive Transportation Inland

The big buying from China is in the future, but the real large purchases will come with more development, particularly of transportation, and such development will take time. China has few railroads, and these do not get very far away from the coast. To reach the thousands of miles in the interior there is but one method of transportation—rivers, navigable for a considerable distance, and numerous small canals.

China is interlaced with canals, roads being few and the majority so narrow that they can be used only for wheelbarrows. These canals, however, reach practically everywhere, but they also are narrow and so shallow in places that few boats drawing over 3 ft. of water can be used. There are, of course, some canals of greater depth, but not many. The native boats or sampans as a rule draw less than 3 ft. and therefore carry small loads. It is easy to understand why with such limited means of transportation, consumption on a large scale as we use that term is not possible at present.

There are many projects on foot now for enlarging and deepening some of the existing canals, for digging additional canals, and particularly for building more railroads. Europeans and Japanese are taking quite an interest in these new developments, and so are Americans. From what has occurred in the last year it seems reasonable to expect that China before many years will have sufficient railroad and other means of transportation to warrant the building of factories not only along the coast, where practically all her present factories are located, but also in the interior, nearer to supplies of coal and raw material.

### China's Preference for Industrial Self-Help

The intelligence of the Chinese is of a high order and, combined with their infinite capacity for detail, will make them splendid workmen. The leading spirits among the Chinese are of the opinion that there is much more money to be made by manufacturing their requirements than by importing them. They also be-

lieve fully that they will be able to export manufactured articles as well as raw material, and to compete in the world's markets with Europe and America.

Factories have been built by the Chinese and some are operating successfully, but quite a few have failed for the reason that the Chinese as yet have not had sufficient experience in handling the operation or financing of large enterprises. Their ideas are to form joint Chinese and foreign companies, the administrative officers, engineers, factory superintendents and foremen to be foreigners. In that way they get the benefit of the knowledge and experience of the foreigners. They want to hold at least 50 per cent of the stock of such companies, for a company that is owned by over 50 per cent of foreign capital is considered a foreign company, and is entitled to very few privileges and concessions that belong by right to Chinese companies.

It is possible for a foreigner or a foreign company to get some of these concessions, but action by the Chinese parliament is necessary to secure them, and that takes considerable time and money. From the point of view of the foreigner the co-operation of the Chinese is a big advantage in many ways, providing the foreign element keeps control of the operation of the company through its officers, superintendents, foremen, etc. Several such companies are operating successfully, and there is in operation now a trans-Pacific steamship line owned by Chinese. The future development of China will probably be along these lines unless the political situation prevents it.

### "Hongkong Ordinances" Affected by British Order-in-Council

The shipyards and factories of foreign ownership now operating do so mostly under the Hongkong ordinances, that is, under a British charter, many owners and executives being of other than British nationality. In December, however, a British Order in Council was promulgated to take effect in February requiring that the executive head of a company operating under a British charter be a British subject and that the majority of the stock be owned by Britishers. A heavy penalty for non-conformance with this order will require many changes in officers and stockholders by numerous concerns and may result in some liquidations. This will induce subjects of other nations to give serious consideration to the plan of allowing Chinese participation in their enterprises and of forming joint Chinese and foreign companies.

The construction of railroads, waterways, factories, etc., will require very large quantities of steel and machinery in addition to the present needs. Each year will no doubt see an increase and those who get properly established now will reap the benefit of a constantly increasing consumption. Since the majority of Americans desiring to do business in China are not in a position to build factories there or to go into any development projects, they have to choose other ways of entering that market—by opening their own offices or by appointing agencies among firms now established.

### Providing for Establishing the Branch Office

To open a branch office involves many things. Office rents are high, salaries of stenographers, bookkeepers and clerks are very much higher than in America. It will be necessary to have a Chinese staff as well as a foreign staff. At present a compradore is almost indispensable. He is a combination of head salesman and credit guarantor. The selection of a proper compradore is of prime importance. Due to the large influx of new firms, principally during the last year or two,



it is extremely difficult to secure good compradores with the necessary standing and financial resources.

It will be found necessary to make practically all collections in China after the arrival of material. A branch office can hardly be expected to show results quickly and whoever establishes one must expect to lay out considerable money and wait for some time to have the office show a profit. Making collections at destination involves more or less speculation in exchange.

If an agency is established there are the same conditions in regard to collection at destination, fluctuations in exchange, etc. Most of the established houses are now overloaded with agencies. For instance, it is reliably stated that in Shanghai alone there are 10,000 separate agencies held. Numerous houses have so many now that any new agency is likely to get little attention, unless a representative is sent from this country and made a part of the agent's organization to see that the business of the principals gets attention.

#### Personal Investigation on the Ground

It is impossible to form an idea from this distance of what should be done and the only safe way for anyone contemplating entering the China market to find out what should be done in his particular case is to make a personal investigation on the ground. There have been quite a few failures and withdrawals of firms who did not make such a preliminary investigation.

The four principal ports of China are Tientsin, Shanghai, Hankow and Hongkong. Hankow buying is done mostly through Shanghai, which does more business than any port in China, and is probably the best place in which to begin an investigation.

While southern China at the present time is in rebellion against northern China, and while there have been some clashes of troops, the life of an American is comparatively safe anywhere in China. In spite of the many complications in doing business there, and in spite of the unsettled political conditions, considerable business is to be done now. The outlook is for very much more in the future, if it is intelligently and properly handled.

#### Iron and Industrial Stocks

Irregularity and comparative quiet have featured the market for iron and industrial securities during the past week owing to conflicting cross-currents in the business world. Imports of gold from England have served to strengthen the foreign exchange situation and the belief that Europe will be in a position to do business with us on a more profitable basis sooner than most people expect. Some uneasiness has been felt, however, regarding developments in the German situation.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com. 43 - 46 1/4	Lackawanna Steel 77 - 79 3/4
Am. Can. com. 47 1/2 - 50 1/4	Lake Sup. Corp. — - 19
Am. Can. pf. 97 1/4 - 97 1/2	Midvale Steel. 46 1/4 - 47 3/4
Am. C. & F. com. 141 1/2 - 145 1/2	Nat. Acme. 36 7/8 - 38
Am. C. & F. pf. 113 1/2 - 114 1/4	Nat. E. & S. com. 76 - 77 1/4
Am. Loco. com. 102 - 105 3/4	N. Y. Air Brake. 105 - 111 3/4
Am. Loco. pf. — - 105	Nova Scotia Stl. 63 - 68
Am. Radiator com. — - 330	Pittsburgh Stl. pf. — - 89 3/4
Am. Stl. F. com. 46 3/4 - 48	Press. Steel com. 99 1/2 - 102 3/4
Am. Stl. F. pf. 91 - 91 1/4	Press. Steel pf. — - 102 3/4
Bald. Loco. com. 132 1/2 - 140 3/4	Ry. Stl. Spg. com. 97 - 99
Bald. Loco. pf. — - 101 3/4	Replogle Steel. 46 1/2 - 49
Beth. Steel com. — - 91	Republic com. 105 - 110 3/4
Beth. Stl. Cl. B. 94 1/2 - 98	Republic pf. 98 1/2 - 98 1/2
Beth. Stl. 8%, pf. 111 1/4 - 112 3/4	Sloss com. 71 1/2 - 74
Case, J. I. pf. — - 97 3/4	Superior Steel. 55 - 56 1/4
Chl. Pneu. Tool. 100 - 104	Transue-Will. 58 1/2 - 62
Colorado Fuel. 39 - 40 3/4	Un. Alloy Steel. 48 - 48 3/4
Crucible Stl. com. 254 - 277	U. S. Pipe com. 22 1/4 - 24 3/4
Crucible Stl. pf. 96 1/2 - 98	U. S. Steel com. 102 1/4 - 106 1/4
Gen. Electric. 157 1/4 - 160 3/4	U. S. Steel pf. 112 1/2 - 112 3/4
Gt. No. Ore. cert. 38 - 39 1/2	Vanadium Steel. 68 - 73 1/2
Gulf States Stl. 67 1/4 - 69	Va. I. C. & Coke. 87 1/4 - 90
Int. Har. com. 127 - 134 3/4	Westingh. Elec. 52 1/2 - 54 1/4

G. A. Lindstedt, president A. B. Galco, Ltd., Stockholm, Sweden, and of the American Galco Co., Inc., New York, has arrived in the United States for a few months' sojourn.

## DECLINE IN INQUIRIES

### Japanese Buyers Not So Anxious to Place Orders —Other Export Business

Exporters remark a pronounced decline in inquiries from Japanese buyers, who have evidently over-bought themselves in numerous cases. Japanese banks are refusing to extend further credit, apparently waiting until more shipments of material have been made and a turn-over of money taken place. At the same time, exporters are experiencing less difficulty in placing orders with the mills. According to one exporter, speculators who have been holding stocks for higher prices are in several instances unloading on the assumption that prices have reached the peak. This company, which deals with Far Eastern markets, states that within the past two weeks it has been offered a total of about 10,000 tons of material from various sources, included in which were 1000 tons of fine gage, blue annealed and black sheets. Although an option was taken on these until April 3, the company was able to place only about 200 tons with its Japanese customers. Several export houses report March business as the best this year. A representative of a New York export concern in Japan has accepted an order for 100 miles of 12-lb. rail for shipment in April and is positive of his ability to deliver. Another firm has placed several small orders for light rails for third quarter delivery.

A company dealing with European markets has booked an order for 5000 tons of pig iron for shipment to Genoa, Italy, on a three months credit and expects to close with the same buyer for an additional 5000 tons for later shipment. Another concern has an inquiry from France for 900 tons of 60 1/2-lb. rail, the ultimate destination of which is Austria. A company dealing with South American markets, Cuba and the Philippines has shipped about 7775 tons of material for the month of March. The heaviest buyers were Havana, Cuba and Manila, P. I. The material included 2400 tons of rails, 1700 tons of reinforcing bars, 1175 tons of mild steel bars and 775 tons of sheets. This concern's business with Buenos Ayres and other South American markets was lighter than usual during March.

China has bought upward of 200 tons of 3/16 and 1/8-in. plates for delivery over the succeeding three months, paying 4c., Pittsburgh base, and the extras applying to domestic business. Japan has a few days' option on 2500 to 3000 tons for like delivery, also at 4c.

Upward of 1000 tons of basic iron has been sold at \$43 at furnace.

#### Steel Shipped to France

The Smith-Eisemann Corporation of America, New York, exporter, which recently purchased 8075 tons of steel and later 14,000 tons from the United States Shipping Board, shipped the last cargo of this material to France on April 5. This steel with an additional 14,000 tons purchased from other sources, making the total about 22,000 tons, was purchased by French shipyards for \$2,300,000. With the steel the company has sold the French shipbuilding interests a large quantity of winches, windlasses, steering engines and stern posts. These purchases were handled on an irrevocable letter of credit through the Bank Transatlantique, Paris, and the Irving National Bank, New York.

The Connellsville Electric Steel Co., Connellsville, Pa., has been incorporated with a capital of \$100,000 by B. F. Markell, E. M. Gadsy and Worth Kilpatrick. The company will build a plant at Connellsville to make electric tool steel.

The Cashman Tool Co., Waynesboro, Pa., manufacturer of reamers and tools, is planning to double the capacity of its plant. To provide funds directors have authorized the sale of \$50,000 of 7 per cent cumulative preferred stock. H. I. Cashman is president and general manager.

## Virginia Iron, Coal & Coke Co. Report

Due to a cut in reductions made for taxes, interest and other charges over 1918, the Virginia Iron, Coal & Coke Co. was able to earn \$11.85 per share in 1919 against \$11 in 1918. Gross earnings in 1919, however, were less by \$2,811,087 than in 1918 and totaled \$10,271,985. After expenses, etc., net was \$1,403,778, a decline of \$333,515 from the year before. At the end of the year there was a surplus of \$530,913, an increase of \$55,138 over 1918.

The company last year operated its furnaces at a profit of \$104,810, as compared with an operating loss of \$75,650 in 1918. There was an operating loss of \$2,370 in foundries and shops operations in 1919, as against a profit of \$2,690 in 1918. The margin of profit in coal mine operations last year was \$1,058,694, whereas in 1918, it was \$1,216,761. The coke ovens in 1919 yielded a profit of \$223,901, as contrasted with \$578,703 in 1918, and the grist mills a profit of \$18,741, as against \$14,787 in 1918. The company last year showed a slight increase in the efficiency of the coke ovens and it took less coke to produce a ton of pig iron. The company produced 128,754 tons of pig iron, 275,823 tons of coke and mined 1,672,495 tons of coal in 1919.

"The pig iron production of this country to-day is limited, to a great extent, by the supply of coke," says President John B. Newton in his remarks to the stockholders, "and your company has the great advantage of owning extensive coal mines, producing coal of high coke value. Manufacturers of pig iron who have had to buy their coke, have had great difficulty in getting their requirements, and, in many instances, have been forced to either slow down production or take coke of inferior quality in order to keep their plants running.

"It would be impossible to estimate with any degree of accuracy the value of your 120,000 acres of coal lands. During the past five years we have been prospecting and developing many of your large tracts that up to this time have not been operated, and the more thorough our examination, the more valuable we find them to be."

## Sixth Report of Gulf States Steel Co.

According to the sixth annual report of the Gulf States Steel Co., Birmingham, Ala.: "On April 1 operations at the steel works were reduced from 80 to 60 per cent basis, the blast furnace was blown out and the by-product coke ovens were put on slow time. In anticipation, however, of the difficulties which arose later in connection with the coal supply, a large tonnage of coal was accumulated. Permit having been obtained from the British Board of Trade for the sale of billets in England, shipments of this commodity were resumed and continued until the foreign exchange situation became demoralized. In the third quarter, business began to revive with the exhaustion of accumulated stocks of manufactured products and more normal operations were resumed.

"To further balance the steel plant, it was decided to enlarge the wire drawing department and to double the capacity of the nail mill, thus permitting the operation of the rod mill on double turn, the increased supply of wire thus available enabling the barbed wire and woven fence departments to run more regularly without any additional equipment. The capacity of the merchant bar mill has also been doubled. To reduce the cost of operation, it was decided to install two turbo-generators, 2000 kw. capacity each, to be operated by exhaust steam. Additional bars, rods and wire products will be available for sale in lieu of billets within the second quarter of 1920."

Production figures for 1919, compared with 1918, are as follows: Pig iron, 59,149 tons in 1919, 72,341 in 1918; coke, 134,090 in 1919, 168,061 the year before; ingots, 135,371 gross tons in 1919, 167,930 in 1918; billets and slabs, 120,276 gross tons in 1919, 143,068 tons in 1918; wire rods, 68,185 gross tons in 1919, 67,538 tons in 1918; wire, bright and annealed, 73,328 net tons in 1919, 68,759 tons in 1918; wire, galvanized, 39,681 net tons in 1919, 24,472 tons the year before;

wire products, 67,662 net tons in 1919, 62,083 tons in 1918.

The net operating income for 1919 amounted to \$645,062, a decrease of \$1,080,788 from the year preceding. After depreciation and taxes, net profits carried to surplus amounted to \$279,422.

## Superior Steel Corporation Report

The annual report of the Superior Steel Corporation, Pittsburgh, works at Carnegie, Pa., was issued last week.

The profit and loss account for the year follows:

Sales .....	\$7,744,921.28
Less discounts allowed.....	83,643.48
Net sales .....	\$7,661,277.80
Cost of sales.....	5,946,933.99
Gross profits .....	\$1,714,343.81
Miscellaneous income .....	124,233.41
Gross income .....	\$1,838,577.22

The surplus account is as follows:

Surplus, Jan. 1, 1919.....	\$501,034.40
Discount on preferred stock purchased .....	1,895.89
Net income for the year ended Dec. 31, 1919.....	1,356,409.96
	\$1,859,340.25
Disbursements and appropriations of earnings:	
Dividends .....	\$588,404.00
Sinking fund, 1st pref. stock...	105,000.00
Sinking fund, 2d pref. stock...	60,000.00
Reserve for federal income and excess profits taxes.....	374,683.82
	1,128,087.82
Surplus Dec. 31, 1919.....	\$731,252.43

E. W. Harrison, president of the company, in the report said in part:

During the past year we have gone through very delicate conditions, due to the necessary reconstruction of business after three years of war times. We think our stockholders have reasons to feel elated over the results obtained during the past year, owing to this reconstructive condition.

We also had to contend with the general labor troubles in the steel industry, as well as the coal strike, and this balance sheet shows that your company has gone through all of these serious difficulties in a very satisfactory manner.

The demand for our product is greater than we ever experienced, and the future indicates that very good results will be obtained during the coming year.

The plant is in the very best physical condition. A large number of additions and improvements have been made during the past year, and further improvements and extensions are in the course of erection. These improvements mentioned will increase our production about 25 per cent, and should be completed about the middle of the year.

## Report of Chicago Railway Equipment Co.

Though the report of earnings for 1919 of the Chicago Railway Equipment Co. will be issued later, the twenty-seventh annual report has just been published by President E. B. Leigh, in which he states: "The splendid financial condition of your company and its high standing in the financial and commercial world should be as gratifying to the shareholders as to its management." The president adds:

"After a careful investigation it was decided to equip the Marion, Grand Rapids, and Franklin plants with pulverized coal systems. This will effect not only a very great saving in the amount of coal consumed (conservatively estimated to be at least 40 per cent), but will also effect a large saving of labor. The cost of these installations will approximate \$250,000 and, under normal conditions of operation, it is expected they will pay for themselves within three years." The stock was placed upon an 8 per cent basis for 1919 and it is expected that this rate will be maintained regularly.

## Earnings of Various Companies

The net earnings of the Pierce-Arrow Motor Co. last year, after allowing for charges and Federal taxes, amounted to \$2,491,070, which, after paying preferred dividends, was equal to \$6.76 a share on the common stock, which has no par value. In 1918, the company earned \$7.80 a share on its common stock.

In common with most companies of a similar kind, the 1919 report of the Walworth Mfg. Co., Boston,

shows a contraction in business that year. The company's net earnings after taxes and the payment of the preferred dividend were equal to \$3.24 a share on the common stock, as compared with \$3.39 in 1918. The working capital as of Dec. 31 last was \$4,795,568, contrasted with \$4,628,057 at the close of 1918.

By eliminating special appropriations last year, the Western Electric Co. was showing net earnings and a surplus considerably in excess of figures contained in the 1918 report, notwithstanding a decrease of approximately \$10,000,000 in gross sales. The company's 1919 report discloses a balance available for dividends of \$4,388,909, which is equal to \$17.26 a share on the 150,000 common shares, after preferred dividends.

### Crucible's Stock Dividend

Directors of the Crucible Steel Co. of America last week declared both common stock and cash dividends, the former being 50 per cent and the latter 3 per cent, both payable on April 30 to stockholders of record April 15. The stock dividend will mean the issuance of 125,000 additional shares with a par value of \$12,500,000. This is the first prominent corporation to declare such a stock dividend since the decision of the United States Supreme Court affecting such dividends. When stockholders were called upon to authorize an increase in the common capital from \$25,000,000 to \$75,000,000 a few weeks ago a 200 per cent dividend was thereby made possible.

The common stock of the Crucible Steel Co. of America has sold in the market as high as \$261 per share, and before the war at \$8 and \$10. It has sold as low as \$3 per share. The stock is quoted at present around \$230 and \$235 in the open market. Effective April 30 next, the securities of the company will be stricken from the list of the Pittsburgh Stock Exchange by order of the securities' committee. This action was taken at the request of the board of directors of the company. For many months past, dealings in the stock has been confined to the New York Exchange.

### Industrial Finances

A public offering is being made of \$4,000,000 7 per cent 10-year sinking fund notes of the Cleveland Metal Products Co., manufacturer of oil stoves and heaters and aluminum and enameled-steel cooking utensils, at 97½ and accrued interest, which yield about 7.35 per cent on the investment. The notes are dated March 1, 1920.

The Farrel Foundry & Machine Co., Ansonia, Conn., has increased its capitalization from \$1,200,000 to \$2,700,000. The new stock, which is all 7 per cent cumulative preferred, is being offered for public subscription.

The Charles W. Morse interests in the Groton Iron Works, New London, Conn., have applied to the Superior Court of New London County, Conn., for the dismissal of Receiver P. LeRoy Harwood and the termination of the corporation's receivership, except for the limited purpose of effecting the composition agreement, with the retention of Frederick Conlin as sole receiver. The Morse proposal is to settle all claims of creditors on a basis of 20 per cent, payable at once, 40 per cent in six months, and the remaining 40 per cent twelve months later. Creditors will be protected, under the plan, by promissory notes for the delayed payments of 80 per cent, and further safeguarded by a mortgage on the plant, equipment, etc.

At a special meeting of the stockholders of the American Steel Foundries the authorized common stock was increased from \$17,184,000, or 515,520 shares, to \$25,000,000, or 750,000 shares, par \$33 1/3.

The second annual report of the Pittsburgh Rolls Corporation, Pittsburgh, shows sales amounting to \$2,126,542 and net income before Federal taxes of \$191,194 and balance added to surplus of \$43,145. President D. L. Eynon's report to stockholders says: "The orders on our books at present time are in excess of one year ago and the company's plant, from present indications,

will run full time for the first six months of 1920, indicating a more profitable year than the past one. We have added to our property investment account during the year the sum of \$87,620, representing one new open-hearth furnace, two new core ovens, two annealing ovens and additional equipment."

A loss of \$1,095,271 because of the sale of the motor truck department of the Chicago Pneumatic Tool Co. accounts for the slump in the surplus from \$79,026 in 1918 to \$69,879 the following year. Balance available for dividends was \$489,051, or \$7.58 per share in 1919, against \$535,833 or \$8.30 per share in 1918. Net earnings for 1919 increased by \$988,001.

The net profits after taxes, depreciation, loss on European assets for 1919, as reported by the J. I. Case Threshing Machine Co., were \$2,909,482. After allowing for the 7 per cent dividends on the preferred stock, the balance, \$2,029,232, is equal to \$22.30 a share on the company's 91,000 shares of common stock. This showing compares with profits on 83,000 shares of common stock in 1918 of \$18.10 a share.

The Victor Stove Co., Salem, Ohio, has increased its capital stock from \$40,000 to \$120,000. The concern recently bought out the Youngstown Furnace Co. and since that time has been making extensive improvements and additions. It has acquired the factory building of the W. J. Clark Co., which went out of business some time ago, and contemplates moving it to its present plant site.

Gray & Davis, Inc., Cambridge, Mass., report for 1919 shows gross sales of \$5,067,801, an operating profit of \$446,202, and a net profit, after charging off \$234,363 for new dies, fixtures, etc., of \$465,680, which after preferred dividends and before taxes, is equal to \$4.34 a share earned on the 107,074 outstanding common shares.

To finance a new plant stockholders of the Reliance Wheel Co., Youngstown, Ohio, have approved an increase in capital stock to \$200,000 of 8 per cent preferred and 25,000 shares non-par value common stock. The company has developed plans for the manufacture of a steel double disc wheel for automobiles. It has acquired a 30-acre site.

The General Electric Co. earned \$21 a share in 1919 against \$14.76 the year before. Gross sales last year were \$235,980,930, compared with \$221,421,592 in 1918. There was a manufacturing profit after operating expenses of \$36,379,505, or \$5,774,524 more than in 1918. A balance of \$11,061,118 was added to the previous surplus of \$53,250,662, bringing the total to \$64,311,780. Stockholders of the General Electric Co. have authorized an increase in the company's capitalization from \$125,000,000 to \$175,000,000. This transaction completes the company's 1920 financing plan.

Proper authority has been given for an issue of 7500 shares of Rainier Motor Corporation 8 per cent cumulative preferred stock, par \$100, of which 7000 shares are to be issued immediately, and 30,000 shares of common stock, no par value, all of which is to be issued at an early date. Money derived from the sale of these shares will be used to erect extensive additions to its Flushing, L. I., plant for the manufacture of worm-driven trucks.

Because of reductions in both Federal taxes and bad debts the earnings of the National Acme Co. increased from \$4.69 per share, \$50 par, in 1918, to \$4.83 per share in 1919, though the net sales declined \$1,952,764 to \$12,240,990. There remained a surplus of \$919,170.

Ellenwood & Doyle, 29 Great Jones Street, New York, who have just completed their first year as distributors of tin plate, black and galvanized sheets, copper, brass, zinc, etc., in order to provide additional capital for their expanding business have decided to incorporate for \$150,000, 8 per cent preferred stock and 1000 shares of common stock of no par value. To provide additional jobbing facilities they have established another warehouse in one of the Bush Terminal buildings, Brooklyn.



## Non-Ferrous Metals

### The Week's Prices

Cents Per Pound for Early Delivery

	Copper New York		Tin New York	Lead		Spelter	
	Lake	Electro-lytic		New York	St. Louis	New York	St. Louis
March 31	19.25	19.00	62.50	9.00	8.75	8.95	8.60
April 1	19.25	19.00	63.25	9.00	8.75	8.95	8.60
2	19.25	19.00	63.25	9.00	8.75	8.95	8.60
3	19.25	19.00	63.25	9.00	8.75	8.95	8.60
5	19.50	19.25	63.25	9.00	8.75	8.95	8.60
7	19.50	19.25	63.25	9.00	8.75	8.95	8.60

NEW YORK, April 6.

Following the Easter holidays the markets are only moderately active. Buying of copper has been exceedingly heavy and prices have advanced. The tin market is quiet and this has been intensified by the extended Easter recess in London. Demand for lead is normal and the market is a little stronger. The zinc market has been quite inactive, but prices have been fairly steady. Antimony is quiet but firm.

### New York

**Copper.**—While buying of copper in March has been variously estimated at from 300,000,000 to 400,000,000 lb., there is no question that the amount purchased has been exceedingly heavy. As a result of the partial holidays, incident to Easter, demand has fallen off slightly but it is still strong and active. The leading producers have advanced their prices to 19.25c., New York, for electrolytic copper for April-May delivery, with a slight premium for June, and are not inclined to quote for third quarter. Lake copper is correspondingly higher at 19.50c., New York.

**Tin.**—The tin market has been and is quiet, due largely to the holiday season which is extensively observed in London. The market there has been closed from Thursday to Monday. As a consequence very little has been done in the market here, and prices are largely nominal. There is, however, a dormant inquiry which will come to the front on any recession in prices. The disposition of consumers is to buy on the breaks and to let the market alone on the bulges. Spot tin to-day is quoted at 63.25c., New York, the London market being slightly off from the day before at £359 per ton, substantially the same figure as a week ago. The advance in exchange has tended to maintain a high price for tin. The quantity of tin afloat on March 31 was 2215 tons, and the amount in stock and landing was 2848 tons, the deliveries into consumption for the month having been 5130 tons. These figures show that there are only 5163 tons theoretically available for consumption in April. It is argued that with a good consumption this month there might be short supplies toward the end of the month which would mean stiff premiums on prompt and nearby tin. This situation has been brought about largely by the selling of tin in this market below import cost in the last few months.

**Lead.**—The market is quiet but a little firmer, due partly to strikes in the port of New York and consequently a shortage of supplies in this district. Quotations are unchanged at 8.75c., St. Louis, and 9c., New York, in the outside market, with the leading interest still quoting 9c., St. Louis, and 9.25c., New York. Sellers who have been cutting prices have evidently stopped, which tends to make a firmer market. Production continues evidently unequal to consumption, which is the feature of the general situation.

**Copper Averages.**—The average price of Lake copper for the month of March, based on daily quotations in THE IRON AGE, was 18.67c. The average price of electrolytic copper was 18.49½c.

**Zinc.**—The market has been exceedingly quiet, one marked by practically no features. Prime Western for early and second quarter delivery is generally

quoted at 8.60c., St. Louis, or 8.95c., New York, with very little being reported. The leading producers are in a very satisfactory position and are confident of a higher market by July. One large producer predicts 10c. zinc by the middle of the year. England at present is not a heavy buyer but is expected to resume her purchases a little later.

**Antimony.**—The market is quiet with wholesale lots of the better grades quoted at 11.37½c. to 11.50c., New York, duty paid, for early delivery.

**Aluminum.**—The market is unchanged with the pure metal obtainable at 33c., New York, from the leading interest, or 31c. from the outside sellers, both for wholesale lots for early delivery.

**Old Metals.**—The market has been quiet. The exchanges being closed over the Easter holidays has helped the uncertainty as to where prices are. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	19.00
Copper, heavy and wire	18.00
Copper, light and bottoms	16.25
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	18.25
No. 1 yellow rod brass turnings	11.50
No. 1 red brass or composition turnings	16.00
Lead, heavy	8.00
Lead, tea	6.50
Zinc	6.00

### Chicago

April 6.—Copper is strong and has advanced to 19.75c. There has been considerable buying and large inquiries have not yet been satisfied. Tin has advanced 1c. and seems on the upward trend. The market in lead has stiffened because producers are holding for higher prices and much the same situation exists in spelter. There is little buying, however, in either metal. Antimony is dull. The old metals remain unchanged except zinc which has declined to 6c. We quote Lake copper 19.75c. for carloads, tin 64.50c., lead 8.87½c., spelter 8.60c. and antimony 12c. On old metals we quote copper wires, crucible shapes, 15.50c.; copper clips, 15.25c.; copper bottoms, 14c.; red brass, 15.50c.; yellow brass, 11.25c.; lead pipe, 7c.; zinc, 6c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 50c., all these being buying prices for less than carload lots.

### St. Louis

April 5.—The non-ferrous markets have been quiet and with the closing of exchanges for Good Friday and Saturday no late quotations were made available. The final quotation was: Lead, 8.70c. and spelter 8.50c. in car lots. In less than car lots the quotations were: Lead, 9.50c.; spelter, 10c.; tin, 66c.; copper, 20c.; antimony, 13.50c. In the Joplin district ore conditions were quiet with no material change from the last figures given. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 9c.; heavy yellow brass, 10.50c.; light copper, 13c.; heavy red brass, 15c.; heavy copper and copper wire, 16c.; zinc, 5c.; lead, 6c.; pewter, 35c.; tinfoil, 43c.; tea lead, 3c.; aluminum, 24c.

The Abradant Products Co. and General Machine & Supply Co., both of Philadelphia, have merged under the name of the latter concern to manufacture iron, steel, etc. The combined capital stock is \$65,000 and William B. Goodall, Narbeth, Pa., is treasurer.

From five to six ore steamers are shipping iron ore at Exelösund for Germany, says the London *Iron-monger*. The Grangesberg mines intend considerably to increase their exports to Germany and have made new agreements with their German customers.

Furnace D of the Bethlehem, Pa., plant of the Bethlehem Steel Co., was blown in April 1. Five of the Bethlehem furnaces are now in blast.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Jan. 1, 1920, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload 80,000 lb. To the Pacific Coast the rate on steel cars and structural steel is \$1.315, minimum carload 40,000 lb.; and \$1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less 59c.; rail and water car lots, 34.5c.; less 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above rates vary somewhat and are given in detail in the regular railroad tariffs.

## Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 4c.

## Wire Products

Wire nails, \$3.25 to \$4.00 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50 and shorter than 1 in., \$2.00. Bright basic wire, \$3 to \$3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3 to \$3.50; galvanized wire, \$3.70 to \$3.95; galvanized barbed wire and fence staples, \$4.10 to \$4.45; painted barbed wire, \$3.40 to \$3.75; polished fence staples, \$3.40 to \$4.50; cement-coated nails, per count keg, \$2.85 to \$3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent for small lots, f.o.b. Pittsburgh.

## Bolts, Nuts and Rivets

Large structural and ship rivets.....\$4.50 base  
Large boiler rivets.....\$4.60 base  
Small rivets.....50 per cent off list  
Small machine bolts, rolled threads,

40, 10 and 5 per cent off list  
Same sizes in cut threads.....40 and 5 per cent off list  
Longer and larger sizes of machine bolts,

30 and 10 per cent off list  
Carriage bolts, ¾ in. x 6 in.:

Smaller and shorter, rolled threads, 40 and 5 per cent off list  
Cut threads.....30 and 10 per cent off list

Longer and larger sizes.....30 per cent off list  
Lag bolts.....50 per cent off list

Plow bolts, Nos. 1, 2 and 3 head.....40 per cent off list  
Other style heads.....20 per cent extra

Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:

Smaller and shorter.....35 per cent off list  
Longer and larger sizes.....25 per cent off list

Hot pressed and cold pressed sq. or hex. blank nuts...2c. off list  
Tapped nuts.....\$1.75 off list

Semi-finished hex. nuts, U. S. S. and S. A. E.:

¾-in. and larger.....60 and 5 per cent off list  
9/16-in. and smaller.....70 and 5 per cent off list

9/16-in. and smaller A. L. A. M. or S. A. E.,

70, 10 and 5 per cent off list  
Stove bolts in packages.....70 and 10 per cent off list

Stove bolts in bulk.....70, 10 and 2½ per cent off list  
Tire bolts.....55 and 10 per cent off list

Track bolts.....6c. base  
One cent per lb. extra for less than 200 kegs. Rivets in

100-lb. kegs 25c. extra.  
All prices carry standard extras f.o.b. Pittsburgh.

## Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52 to \$70; chain rods, \$75 to \$80; screw rivet and bolt rods and other rods of that character, \$65 to \$70. Prices on high carbon rods are irregular. They range from \$75 to \$100, depending on carbons.

## Railroad Spikes and Track Bolts

Railroad spikes, ¼ to 9/16 in. and larger, \$4.00 per 100 lb. in lots of 200 kegs, of 200 lb. each or more; spikes, ¾-in. and 7/16-in., \$4.25; 5/16-in., \$5; track bolts, \$4.90 to \$5. Boat and barge spikes, \$4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, \$3 to \$4 per 100 lb.

## Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

## Iron and Steel Bars

Steel bars at 2.35c. to 4.00c. from mill. Common bar iron, 4.50c.

## Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe, applying as from Jan. 14, 1920, and on iron pipe from Jan. 7, 1920:

Steel		Iron	
Inches	Black Galv.	Inches	Black Galv.
1½, 1¼ and ¾	47	1½ and 1¼	1 + 25
1½	51	1½	25½ + 1½
¾ to 3	54	1½	29½ 11½
		¾ to 1½	34½ 18½
		2 and 2½	33½ 17½
Lap Weld		Lap Weld	
2	47	1½	24½ 9½
2½ to 6	50	1½	31½ 17½
7 to 12	47	2	28½ 14½
13 and 14	37½	2½ to 6	30½ 17½
15	35	7 to 12	27½ 14½
Butt Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
1½, 1¼ and ¾	43	1½	+7 +40
1½	48	¾	23½ 6½
¾ to 1½	52	1½	28½ 15½
2 to 3	53	¾ to 1½	34½ 19½
		2 and 2½	34½ 19½
Lap Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
2	45	1½	21½ 6½
2½ to 4	48	1½	27½ 13½
4½ to 6	47	2	29½ 16½
7 to 8	43	2½ to 4	31½ 19½
9 to 12	38	4½ to 6	30½ 18½
		7 to 8	22½ 10½
		9 to 12	17½ 5½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

## Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3½ to 4½ in.....40½	1½ and 1¾ in.....+20
2½ to 3½ in.....30½	2 and 2½ in.....+10
2½ in.....24	2½ and 2¾ in.....+1
1½ to 2 in.....19½	3 and 3½ in.....—1½
	3½, 4 and 4½ in.....—8

## Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in.....\$327	1½ in.....\$207
1¼ in.....267	2 to 2½ in.....177
1½ in.....257	2½ to 3¼ in.....167
1½ in.....207	4 in.....187
	4½ to 5 in.....207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

## Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

## Blue Annealed—Bessemer

No.	Cents per lb.
Nos. 8 and heavier.....	3.50 to 5.95
Nos. 9 and 10 (base).....	3.55 to 6.00
Nos. 11 and 12.....	3.60 to 6.05
Nos. 13 and 14.....	3.65 to 6.10
Nos. 15 and 16.....	3.75 to 6.20

## Box Annealed, One Pass Cold Rolled—Bessemer

No.	Cents per lb.
Nos. 17 to 21.....	4.15 to 6.30
Nos. 22 to 24.....	4.20 to 6.35
Nos. 25 and 26.....	4.25 to 6.40
No. 27.....	4.30 to 6.45
No. 28 (base).....	4.35 to 6.50
No. 29.....	4.45 to 6.60
No. 30.....	4.55 to 6.70

## Galvanized, Black Sheet Gage—Bessemer

No.	Cents per lb.
Nos. 10 and 11.....	4.70 to 7.50
Nos. 12 to 14.....	4.80 to 7.60
Nos. 15 and 16.....	4.95 to 7.75
Nos. 17 to 21.....	5.10 to 7.90
Nos. 22 to 24.....	5.25 to 8.05
Nos. 25 and 26.....	5.40 to 8.20
No. 27.....	5.55 to 8.35
No. 28 (base).....	5.70 to 8.50
No. 29.....	5.95 to 8.75
No. 30.....	6.20 to 9.00

## Tin-Mill Black Plate—Bessemer

No.	Cents per lb.
Nos. 15 and 16.....	4.15 to 6.15
Nos. 17 to 21.....	4.20 to 6.20
Nos. 22 to 24.....	4.25 to 6.25
Nos. 25 to 27.....	4.30 to 6.30
No. 28 (base).....	4.35 to 6.35
No. 29.....	4.40 to 6.40
No. 30.....	4.40 to 6.40
Nos. 30½ and 31.....	4.45 to 6.45

CORRESPONDENCE

Chart for Testing Steel Wire

To the Editor: I have read with much interest the article regarding charts for testing steel and steel wire by Mr. Brayton, M.E., published in THE IRON AGE of Jan. 1, 1920. For a number of years I have used various charts to aid in the rapid determination of the tensile strength of wire, also in figuring the proper drafting, etc. I have found the accompanying chart of assistance as we need to know the actual breaking strength of some wires at 80,000 lb. per sq. in. and others at 400,000 lb. per sq. in. It is necessary to know the reduction of area as well as the size when heat treated and at finish; also the proper drafting or reduction in area at each draft. All such information can be quickly obtained from the chart. As the chart is based on areas it can be used for flats or squares after the areas of the same have been calculated.

For convenience in our work, I start the ordinate

with 0.0003 sq. in. (0.0195 diameter wire) using logarithmic paper increasing by 0.0003 sq. in. up to 0.003 sq. in. (0.0618 diameter wire). For convenience the decimal point and ciphers are omitted in the figures of area, these being shown as 3 to 30.

The second column of ordinates corresponds to wire with 10 times the area, for example, 0.0009 sq. in. = 0.339 diameter and 0.009 sq. in. = 0.107 diameter.

I start the abscissæ at 10 lb. and multiples of 10. It is necessary that the worker knows from inspection the location of the decimal point. For example, if one wants to know the breaking strain of a wire 0.0075 diameter at 440,000 lb. per sq. in., 0.00757 corresponds to 0.0757 and following along 0.0757 line we get 198 lb. on the abscissa; for wire 0.024 diameter the test would be 198 lb. and for 0.0757 diameter 1980; for 0.240 diameter, 19,800 lb. and for 0.757 diameter 198,000 lb. If one wanted 44,000 lb. per sq. in. the tests would be 1/10th the above or 1.98; 19.8; 198.0; 1980.0 lb. respectively.

To construct the diagonal lines showing the ultimate tensile strength, two points can be plotted to locate the line. For instance, to plot the line 80,000, take area 30 (0.003 sq. in.). This wire would break at 80,000 x

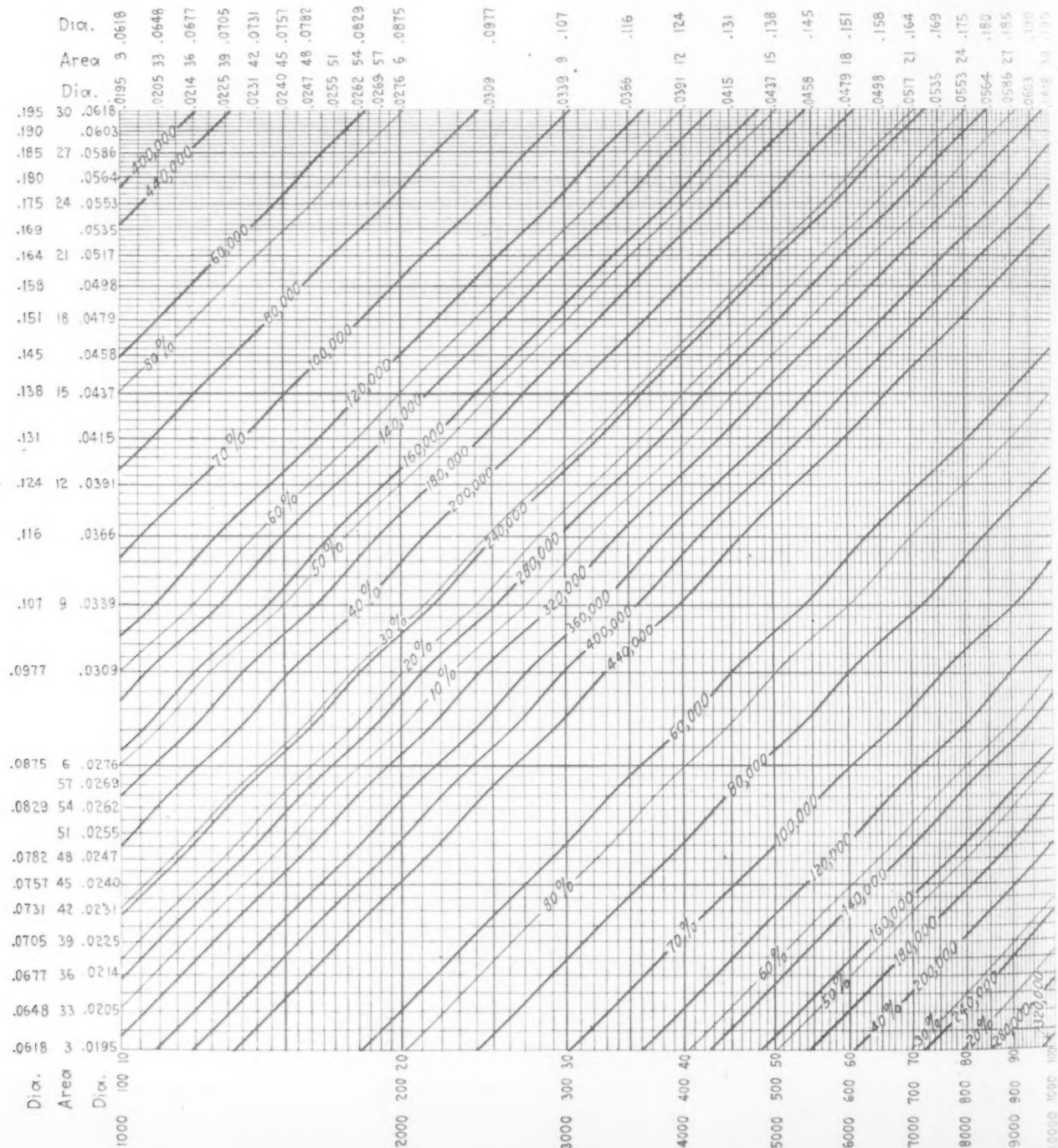


Chart for Use in Determining the Tensile Strength of Steel Wire and in Figuring the Proper Drafting



003 = 240 lb. Locating 24 on the abscissa and following up the ordinate to the intersection of the horizontal line 30, gives the top point of the line. Another point can be located by taking area 15. This gives 80,000 x 0.0015 = 120 lb. Following the vertical line 12 to its intersection with the horizontal line 15 gives a second point, and the line 80,000 can then be drawn. This line can be checked for accuracy, as all diagonals are at an angle of 45 deg.

The upper horizontal scale is an exact duplicate of the vertical scale, beginning with the smaller area at the left. This scale is used for obtaining reduction of area. For example, to obtain the area of 0.0012 sq. in. wire, 50 per cent reduction of area, follow along horizontal line 12 (0.039 diameter) to intersection with the 50 per cent diagonal, then follow up on the vertical ordinate to obtain reading 0.0006 sq. in. (0.0276 diameter) on the upper scale. The per cent reduction lines are plotted in the same manner as the lines for tensile strength.

For flats using the standard area of  $\frac{1}{4}$  sq. in., one would use the line 0.0977 — 0.0309 wire. Suppose one had a specification for flats to be tested at  $\frac{1}{4}$  sq. in. to a tensile of 120,000 per sq. in., 60 per cent reduction of area, breaking strength would be 90,000 lb., area of fracture, 0.30 sq. in. For convenience the diameters and strengths should be written in black ink; the areas and reductions of area in red ink.

In the charts based on areas as indicated the paired numbers equal 90 per cent reduction of area; for example, 90 per cent reduction or area 0.107 equals 0.0339 wire. I hope these remarks will cause others to publish charts which they have found helpful.

E. H. WEBB,

President Webb Wire Works.

New Brunswick, N. J.

### Specifications for Welding Wire

*To the Editor:* In order that the consumer of welding electrodes may know what to order for specific uses, the writer is submitting the inclosed specifications. Although these specifications may neglect some types of welding wire, the results as given in the specifications have been proven, and therefore the consumer will be safe in purchasing electrode material of these specifications.

All welding electrodes should undergo the following test, regardless of chemical analysis, except electrodes with the prefix "special."

A—An even flat bead should be deposited overhead without undue trouble by an operator who is accustomed to weld overhead. This does not mean that metal should start at once but that after the arc has started a reasonable amount (6 in.) should be deposited without breaking the arc.

B—A bead should be laid down (flat welding) at least 4 in. long and said bead should be ground flush with the plate without showing any gas pockets or oxide inclusions, during the grinding.

C—A bead should be laid (vertical welding) upward without bunching up.

Electrodes for use where a tensile strength of not more than 50,000 lb. per sq. in. is desired and where ductility is not an important factor.

C. not over.....	0.18
Mn. ....	0.60
P. not over.....	0.05
S. not over.....	0.05
Si. not over.....	0.05

Electrodes for use where a tensile strength of between 50,000 and 60,000 lb. per sq. in. is desired, and where ductility is not an important factor.

C. ....	0.25-0.35
Mn. ....	0.60-0.80
P. not over.....	0.05
S. not over.....	0.05
Si. not over.....	0.05

Electrodes, where a tensile strength of over 60,000 lb. per sq. in. is desired, or where great ductility is needed.

C. ....	0.35-0.45
Mn. ....	0.80-1.10
P. not over.....	0.05
S. not over.....	0.05
Si. not over.....	0.05

Special electrode for hard wearing surfaces (to be

used only on flat surfaces such as street car tracks and not on any veed section).

A C. ....	0.90-1.15
Mn. ....	0.35-0.55
P. not over.....	0.05
S. not over.....	0.05
Si. not over.....	0.05

B C. ....	0.70-0.90
Mn. ....	0.80-1.00
P. not over.....	0.05
S. not over.....	0.05
Si. not over.....	0.05

The packing, shipping, size of coils, etc., should be left to the discretion of the manufacturer except that material should be so shipped that it arrives at its destination in the same condition as it leaves the mill.

J. CHURCHWARD,

Metallurgist, Wilson Welder & Metals Co.,  
2 Rector Street, New York.

### Commended for Patriotic Service

Youngstown Sheet & Tube Co., Trumbull Steel Co., Republic Iron & Steel Co., Truscon Steel Co. and General Fireproofing Co. are among companies in the Mahoning Valley which have received from the War Department a certificate in acknowledgment of their services during the war.

A typical citation, signed by the Secretary of War, reads:

"The War Department of the United States of America recognizes in this warrant for distinguished services, the loyalty, energy and efficiency in the performance of the war work by which the Trumbull Steel Co. aided materially in obtaining victory for the arms of the United States in the war with the Imperial German Government and the Imperial and Royal Austro-Hungarian Government."

Manager General George W. Burr, assistant chief of staff and director of purchases, in a letter which accompanied the certificate to the Trumbull company, said that the certificate was granted for making prompt deliveries and otherwise co-operating with the Construction Division of the Army.

The citation to the Youngstown Sheet & Tube Co. reads:

"For highly efficient service, closest co-operation in anticipating the Government's needs, expediting deliveries and in every way contributing to the successful execution of the activities of the Procurement Division of the Construction Division of the Army."

During the war the Truscon Steel Co. permitted every resource required by the Government to be commandeered. It manufactured thousands of gas shells, hangars of corrugated sheeting that housed airplanes and steel buildings used as barracks in the cantonments.

Arthur G. McKee & Co., Cleveland, have taken an order for a Kling-Weidlein dry gas cleaning plant for the Cargo Fleet Iron Co., Middlesborough, Eng. Benjamin Talbot, managing director, and Capt. J. E. James, general works manager of the British company while in America recently, made an inspection of this dry method of cleaning which resulted in the placing of the order. This is the third order for a Kling-Weidlein dry gas cleaning equipment that has been placed recently by British works. Arthur G. McKee & Co. have also taken an order for two Kling goggle valves for installation in connection with the No. 1 and No. 2 furnaces of the Wharton Steel Co., Wharton, N. J., which are being rebuilt by the Cleveland firm. Other orders were recently placed for these valves by the Thomas Iron Co., Ford Motor Co., Donner Steel Co., Cambria Steel Co. and Brier Hill Steel Co.

The Foundation Oven Corporation, New York, is considering the erection of a battery of coke ovens in or near New Haven or Hartford, Conn. No definite steps in the matter have been taken, however.

The corporate name of the Blevaney Machine Co., Boston and Newark, polishing belts, etc., has been changed to the Production Machine Co.

## PERSONAL

J. T. Thompson, Simonds Mfg. Co., Fitchburg, Mass., saws, on April 5 addressed the Engineers' Club, Greenfield Tap & Die Corporation, Greenfield, Mass., on "What Makes a Man."

Ernest Chassin, Paris, France, engineering specialist, has become associated with the American Writing Paper Co., Holyoke, Mass. Mr. Chassin specializes in paper machinery.

Samuel P. Hall, architect, late of the construction division, U. S. Q. M. C., and Harold M. Bush, mechanical engineer, late colonel of field artillery, A. E. F., have formed a partnership under the name of Hall & Bush for the general practice of architecture and engineering as specialists and consultants with particular reference to factories and other industrial plants. They have established connections with Henry V. Hubbard, professor of landscape architecture, Harvard, late chief of the division of town planning, United States Housing Corporation, for the treatment of housing problems, real estate developments and landscape architecture. They have opened offices at 16 South Third Street, Columbus, Ohio.

R. J. Dixon, for the past 17 years with the Stanley Works, New Britain, Conn., has severed his connection with that company to engage in the general contracting business in that city. Mr. Dixon was superintendent of construction at the Stanley Works.

C. C. McDermott has assumed charge of the Chicago office of the Brown Instrument Co., Philadelphia, succeeding J. W. Lazear, who recently resigned to take up other work in New York. Mr. McDermott has been transferred from the Philadelphia office where he has been district manager. He has studied pyrometers, thermometers, pressure gages and other Brown instruments in the Philadelphia laboratories of the Brown Instrument Co.

The following appointments are announced by the New Departure Mfg. Co., Bristol, Conn.: Walter M. Coe, mechanical superintendent, Meriden; Carl F. Baldwin, assistant mechanical superintendent, Meriden; John F. Lang, production superintendent, Meriden; Wesley R. Johnson, mechanical maintenance superintendent, forge and machine shop, Bristol.

Robert K. Morton, general manager George W. Prentiss & Co., Holyoke, Mass., wire mill, has sold his interest in the company to W. A. Prentiss and bought the Prentiss holdings in the Holyoke Covered Wire Co. Mr. Morton will sever his connections with the Prentiss company May 1, upon which date he becomes treasurer of the Covered Wire Co.

J. F. Geary, formerly superintendent for the Thatcher Furnace Co. at Garwood, N. J., is now assistant superintendent of the Chicago plant of the American Brake Shoe & Foundry Co.

P. R. Thurston, Rooms 1021-1022, Park Building, Pittsburgh, has been appointed representative in the Pittsburgh district of the Ludlum Steel Co., Watervliet, N. Y., manufacturer of high-speed, tool and alloy steels, to succeed J. E. Polhemus, who has been transferred to the Detroit office as special representative.

M. P. Heinze has become works manager of the Krebs Mfg. Co., Chicago, jigs, fixtures, tools, etc., having formerly been superintendent of the Union Special Machine Co., Chicago.

Edward C. Gaines has joined the engineering department of the Mead-Morrison Mfg. Co., Chicago, having formerly been engineer in the crane and conveying machinery department, Dominion Bridge Co., Montreal, Can.

W. H. Eshelman, who resigned as superintendent of the 84-in. and 132-in. plate mills of the Brier Hill Steel Co., Youngstown, Ohio, as announced in THE IRON AGE of March 11, has become assistant superintendent of the plant of the Bethlehem Steel Co. at Sparrows Point, Md.

C. E. Smart has resigned as works manager Wells Bros. Co. division, Greenfield Tap & Die Corporation, Greenfield, Mass., to assume a similar position with W. & L. E. Gurley, Troy, N. Y.

Charles S. Thomas, director of the Electric Alloy Steel Co., Youngstown, Ohio, and former president of the old DeForest Sheet & Tin Plate Co., at Niles, Ohio, is convalescing from a serious attack of appendicitis.

L. B. Easton, formerly sales manager with Henry R. Worthington, St. Louis, has become superintendent of production, Laidlaw works, Worthington Pump & Machinery Corporation, Cincinnati.

C. D. Bidwell has become superintendent of construction and works engineer with the J. I. Case Plow Works Co., Racine, Wis., having resigned his position with the International Harvester Co.

Terminating 25 years' service with the Carnegie Steel Co., Harry L. Brinker resigned, effective April 1, as assistant superintendent of blast furnaces at the Ohio Works, Youngstown, Ohio, to become blast furnace superintendent for the Brier Hill Steel Co., Youngstown. He was given a farewell dinner by associates at the Ohio Works and presented a gold watch by superintendents and department heads and a chain and Masonic charm by employees in the blast furnace department. Mr. Brinker started with the Carnegie company as an assistant chemist. He succeeds Wilbur H. Geesman at the Brier Hill company, who has resigned.

Roy E. Brakeman, chief engineer Fairfield works, Tennessee Coal, Iron & Railroad Co., at Birmingham, Ala., is now in a similar position with the Otis Steel Co., Cleveland.

Emil F. Norelius, formerly chief engineer with the Holt Mfg. Co., Peoria, Ill., has opened offices in Minneapolis as consulting and designing engineer.

Charles J. Manuel, formerly with the American Steam Gauge & Valve Co., Boston, has become mechanical engineer with the S. W. Card Mfg. Co., Mansfield, Mass., dies, reamers, taps.

Ralph E. Carpenter, manager of the Lynite Laboratories of Aluminum Manufacturers, Inc., Cleveland, has joined the Hollister-White Co., Boston.

Harry C. Davis, for many years superintendent of the Thomas and Empire hot mills at Niles, Ohio, of the Brier Hill Steel Co., is to become operating manager of the new plant of the Ashtabula Steel Co., Ashtabula, Ohio, capitalized at \$1,500,000. The original layout provides for eight mills, to produce black and galvanized sheets. The contract for the erection of the buildings has been let to the McClintic-Marshall Co., while the General Electric Co. will furnish electrical equipment, including motors, generators, etc.

Frank L. Walter, master mechanic with the Dayton Engineering Laboratories Co., has formed the Walter Engineering Co., Dayton, Ohio, to design and build special tools and machinery.

Rudolph H. Fox, formerly manager of the Detroit district, Gurney Ball Bearing Co., Jamestown, N. Y., has been made Eastern representative, with offices in Hartford, Conn.

James A. Campbell has returned to his desk as executive head of the Youngstown Sheet & Tube Co., Youngstown, Ohio, after a three weeks' stay at Hot Springs, Ark. Other industrial leaders who will return this month to the Youngstown district are James B. Kennedy chairman of the board and chief executive officer of the Brier Hill Steel Co.; Louis J. Campbell, president of the Electric Alloy Steel Co.; E. L. Ford, chairman of the advisory committee and director of the Brier Hill company, and W. A. Thomas, former president of the Brier Hill company. They spent part of the winter in the West or South.

Fred A. Hart, assistant superintendent, Landers, Frary & Clark, New Britain, Conn., has resigned.

John A. Katzenmeyer has resigned as general manager of the Standard Engineering Co., Ellwood City, Pa., and is succeeded by Thomas A. Clark, who has

been treasurer. Mr. Katzenmeyer had been with the company 14 years, starting as shop foreman.

Otto Fagerstrom, formerly in the open-hearth department of the Bethlehem Steel Co. at Steelton, Pa., is now draftsman for the Empire Zinc Co., Canon City, Colo.

O. J. Smith resigned as vice-president Ohio Steel Foundry Co., Lima, Ohio, April 1, and on May 1, will become connected with the production department of the Willys corporation with headquarters in New York.

George C. Boa has recently become the representative for C. E. Johansson, Inc., manufacturer and distributor of Johansson gages, in the Chicago territory. Mr. Boa received his education in the technical schools of Montreal and Chicago, later following this up with thirteen years' practical tool making and designing before entering the army, where he spent fourteen months including active service in France. His experience was gained in the Northern Electric & Mfg. Co., Montreal, the Ford Motor Car Co., Detroit; the Western Electric Co., Hawthorne, Ill., and the Wahl Adding Machine Co., Chicago. At the last named concern he spent nine years in tool designing, inventing, and as superintendent of the adding machine department. C. C. Poucher, who formerly acted as the Johansson representative in this territory, has purchased an interest in the Star Tool and Mfg. Co., Chicago, and is president of that concern.

Henry P. Blumenauer, sales manager Eastern Malleable Iron Co., Naugatuck, Conn., works, has resigned to become president and general manager of the Arcade Malleable Iron Co., Worcester, Mass., which recently was acquired by interests identified with the Baldwin Chain & Mfg. Co., Worcester.

R. E. Hogrebe has resigned as crane manager Chesapeake Iron Works and gone into business for himself, making controllers, the company being known as the Control Mfg. Co., Catonsville, Md. For 18 years he was chief engineer of the Niles Bement Pond Co.; for three years manager of the Chesapeake Iron Works. He has been in the electrical business since 1885 and in the crane business since 1891.

Howard E. Tracy has joined the staff of the O. S. Walker Co., Worcester, Mass., manufacturer of grinding machines and magnetic chucks, as chief of the engineering department. Mr. Tracy has been connected with the Baxter D. Whitney Co., Winchendon, Mass., for the past year and a half, in charge of developing a line of grinding machines.

Augustus Wood, works manager Niles Tool Works Co., Hamilton, Ohio, retired from that company's employ on April 1, after continuous service of 28 years. Mr. Wood hereafter will be connected with the Manning, Maxwell & Moore Co., New York, as advisory engineer of their machine tool company's plant at Fitchburg, Mass.

John F. Alvord, president and director Hendee Mfg. Co., Springfield, Mass., has resigned, and Henry H. Skinner, Springfield, elected to fill the vacancy. F. J. Wechsler, treasurer, has been made vice-president of sales, financing and auditing, and Lieut. Col. Lindley D. Hubbell, commandant, Springfield armory, vice-president of operations and a director.

A. F. Orcutt was elected president and general manager of the Rivett Lathe & Grinder Co., Brighton district, Boston, Mass., at a recent meeting of the directors of the company. Prior to this election he served as vice-president and general manager.

Jean Seybold, formerly with the Niles Tool Works at the Hamilton, Ohio, plant, and who for the past three years has been superintendent of one of the departments of the Watervliet, N. Y., arsenal, returned to Hamilton on April 1, and will take the position of production manager of that plant.

Richard Reininger, superintendent at the plant of the Newark Rivet Works, Newark, N. J., for nearly 30 years, was tendered a token of esteem by the 15 foremen at the plant, representing the 350 employees, on March 27, in the form of a floral horseshoe. The

tribute was paid upon Mr. Reininger's return from a two months' trip to Florida.

The Matlack Coal & Iron Corporation, 52 Vanderbilt Avenue, New York, announces that on April 1 C. Andrade, Jr., resigned as secretary and treasurer and retired from the board of directors. Lieut.-Col. Paul Debevoise, formerly secretary and treasurer the Debevoise-Anderson Co., merchant in pig iron, coal and coke, has been elected to the board of directors and made secretary and treasurer of the Matlack Coal & Iron Corporation and will devote his entire time to its affairs. The officers and directors of the corporation are now as follows: President, Roy A. Rainey; managing trustee, W. J. Rainey; vice-president, Scott Stewart; general manager, W. J. Rainey, vice-president and general manager Rainey-Wood Coke Co.; vice-president and general manager, Howard C. Matlack; secretary and treasurer, Lieut.-Col. Paul Debevoise.

At the recent seventh annual convention of the Refractories Manufacturers Association at White Sulphur Springs, W. Va., John D. Ramsey, St. Mary's, Pa., was elected president for the ensuing year. Other officers are: John L. Green, St. Louis, vice-president; C. C. Edmunds and Frederick W. Donahue, Pittsburgh, treasurer and secretary, respectively.

E. Beighley, formerly general foreman of the tool room at the plant of the Mesta Machine Co., West Homestead, Pa., has resigned and has been appointed representative in the Pittsburgh district of the Erie Crucible Steel Co., Erie, Pa.

J. Fred Townsend, traffic manager of the National Tube Co., Pittsburgh, and a former president of the Traffic Club of Pittsburgh, will be toastmaster at the annual banquet of the Traffic Club to be held at the William Penn Hotel, Pittsburgh, April 8.

Frank S. Schuyler formerly in the sales offices of the Allis-Chalmers Co., Pittsburgh, has been made district sales manager in the Detroit territory and will have his offices in the Ford Building, Detroit.

R. C. Garlick has resigned as Cleveland district sales manager of the Sharon Steel Hoop Co. to become associated with Columbia Steel Co., Elyria, Ohio, as assistant to C. E. Lozier, vice-president and general manager, and will have charge of sales. He has been succeeded in Cleveland by G. A. Singer, who has been district sales manager of Sharon Steel Hoop Co. at its office in Sharon.

Ralph G. Macy has joined the engineering staff of the Engineering & Appraisal Co., Inc., 103 Park Avenue, New York, and has been elected vice-president of the company. He has accordingly resigned his position with Walter Kidde Co., where he has been chief engineer of the construction department. When the United States entered the war, he was in charge of five plants making liquid oxygen and nitrogen by the French Claude liquid-air process. He was granted a commission in the United States Army and later went to Fort Worth, Tex., to construct the first helium gas plant of the war establishment. He has been a resident of New York since 1910, and engaged successively in the construction or operation of gas works, power plants, underground caisson work under compressed air, and high tension electrical distributing systems and sub-stations.

The general offices of the Slick-Knox Steel Co. have been removed from the Chamber of Commerce Building, Pittsburgh, to Sharon, Pa. This concern is about to make additions to its plant at Wheatland, Pa., which will enable it to turn out close to 5000 automobile frames per day.

The recent slight fire at the plant of the Latrobe Electric Steel Co., Latrobe, Pa., was confined to the heat-treating department, which was damaged to the extent of about \$8000. This department is not essential to regular production and the fire will not interfere with the regular schedule of filling orders.



## OBITUARY

### Charles H. McCullough, Jr.

The news of the death of Charles H. McCullough, Jr., president of the Lackawanna Steel Co., on Saturday, April 3, came as a shock to his long-time associates in the steel trade and caused deep regret. Mr. McCullough went South early in February to recuperate after a severe illness. Failing to improve, he was taken to Baltimore about two weeks ago for observation and treatment, and was in a hospital there at the time of his death. With him were Mrs. McCullough and their two daughters.

As has been the case with the majority of men who have come to the presidency of an important steel company, Mr. McCullough's training was on the operating side of the industry. Philadelphia was his birthplace. At the age of 23 he graduated in 1891 from Stevens Institute of Technology with the degree of mechanical engineer. Immediately after leaving school he went to the Illinois Steel Co.'s South works, serving in various capacities there, and after successive promotions became second vice-president. He resigned in 1905 to become vice-president and general manager of the Lackawanna Steel Co., Buffalo, N. Y., becoming thus associated with E. A. S. Clarke, who had preceded him as an executive at the South works of the Illinois Steel Co. The South Chicago works for many years has been a training ground of men who have stood high in the steel industry. In blast furnace and in Bessemer steel practice, as well as in rolling mill development the records there were the result in part of a long-standing rivalry between Pittsburgh and the Chicago district. Mr. McCullough's 14 years at South Chicago and in the executive offices at Chicago included what may be considered the most trying period in the later history of American steel-making. It included the years of depression following the panic of 1893, which were marked by the first use of Mesabi ores in the blast furnace, the revolution in blast furnace practice represented by the building of the 600-ton furnaces at



CHARLES H. McCULLOUGH, JR.

Duquesne, the rapid displacement of Bessemer by open-hearth steel, and the large introduction of labor-saving equipment to achieve the economies forced by the relentless competition of the eighteen-nineties. The Illinois Steel Co.'s financial showing for several years following the panic was far from satisfactory, and the competition with Pittsburgh, which reached its climax in the steel rail war of early 1897 put a severe strain upon the men responsible for operating results. Very often they were makers of bricks without straw. The struggles of that time, about which men now in their fifties or a little beyond can talk interestingly, make a chapter that contrasts sharply with the experiences of the younger executives in these recent years of ample earnings and large budgets for improvements.

Going to Lackawanna, Mr. McCullough had bequeathed to him all the difficulties growing out of the construction misfortunes at the new South Buffalo plant that are a familiar story throughout the industry. The heavy demands upon his energy, his technical skill, his enthusiasm and his ability to rally men are well known, as are the way in which these demands were met and the turning of the tide that came just before the war.

On Jan. 1, 1919, on the resignation of E. A. S. Clarke to become head of the Consolidated Steel Corporation, Mr. McCullough was elected president of the Lackawanna Steel Co. He was also made a director of the American Iron and Steel Institute, and of the Consolidated Steel Corporation, and had a similar connection with the Manufacturers' and Traders' National Bank of Buffalo, the Pierce-Arrow Motor Car Co., the Morris Plan Bank, and the Clark Equipment Co. of Buchanan, Mich. He was a trustee of the Buffalo General Hospital and a member of various clubs in Buffalo and Chicago.

In his 15 years' residence he was a leading figure in the civic life of Buffalo, forwarding every work for the advancement of the community and giving generously of his time. His war-work activities were outstanding. To his genius for accomplishment there was added an unusual charm of personality, and few men in the industry have held so high a place in the regard of their fellows.

ALFRED CARVER HEMINGWAY, president Hemingway Machine Co., Lynn, Mass., tanning and leather machinery, died March 26, at his home on Broadway, Lynnfield, after an illness of a week from pneumonia. Mr. Hemingway was born at Yorkshire, England, in November, 1850, and came to the United States when a youth. In 1886 he founded with his brother the Hemingway Machine Co., and upon the death of his brother became the sole proprietor of the business.

W. I. McMILLAN, manager Cincinnati branch, American Radiator Co., died at his residence in that city recently. Mr. McMillan had been connected with the American Radiator Co. for 19 years, and was about to leave for the South when he suffered a nervous breakdown which resulted in his death.

MICHAEL R. CONWAY, owner of Conway & Co., manufacturers of patent friction clutches, Cincinnati, died at his home in that city on April 2. Mr. Conway was for over 40 years engaged in the machine tool manufacturing business in Cincinnati, and was the

inventor of the first power machine tool lathe manufactured. He was also the inventor of the band-saw used in cutting logs.

JAMES J. DALTON, manager of the Rail Joint Co. department, Illinois Steel Co., Joliet, Ill., died at his home in that city on March 25, aged 52. Mr. Dalton had been in the employ of the Rail Joint Co. for 20 years, during the last 13 of which he was stationed at Joliet.

ELMER APPERSON, Kokomo, Ind., died of apoplexy while watching an automobile race at the Speedway at Los Angeles, Cal., March 28. He was a pioneer automobile manufacturer and president of the Apperson Bros. Automobile Co., Kokomo.

BENJAMIN F. COOMBS, superintendent electric department, Jones & Laughlin Steel Co., Pittsburgh, died on Wednesday, March 24. He was a member of the Association of Iron and Steel Electrical Engineers, and also of the Masonic fraternity.

## No Important Revenue Legislation at the Present Session

WASHINGTON, April 6.—Republican members of the Senate Finance Committee and of the House Ways and Means Committee have begun a series of conferences to determine upon a program for revenue legislation. While a definite agreement has not been reached, the prospects are that there will be no material change in the policy as established earlier in the session. Under this policy, general revision of the revenue laws will not be undertaken at this session, but it is probable there will be an agreement relative to changes in some of the administrative sections of the revenue law as a means of enabling the Treasury Department to avoid some of the complications which have thus far surrounded the administration of the measure.

Senator Watson, of Indiana, began an agitation for repeal of the excess profits tax at this session. The movement seems to have been squelched by other Republicans who, while dissatisfied with the operation of the excess profits tax, yet believe it would not be expedient to repeal it in advance of the Presidential election.

So far as general revision of both the revenue law and the tariff law are concerned, it is expected that action will be delayed, not only until after the Presidential election, but possibly until after March 4, 1921.

Congress is planning to either adjourn or take a recess early in June. It is proposed that a recess of at least two months should be taken during the Republican and Democratic conventions. Whether final adjournment will be taken in June or not is doubtful.

## Mechanical Engineers May Meeting

A foundry session is promised as one of the features of the spring meeting of the American Society of Mechanical Engineers May 24-27 at the Hotel Statler, St. Louis. A rather large scope is indicated in that the subdivisions of foundry work which are to be considered, include malleable castings, die castings, gray iron castings, aluminum castings, steel castings and bronze and brass castings. Other professional sessions include one on appraisal and valuation.

The excursions scheduled list trips to the plants of the Commonwealth Steel Co., the Busch-Sulzer Diesel Engine Co., Mississippi Valley Iron Co., and to works of general interest, such as the water power developments at Keokuk.

The council of the society has appointed a committee to appear before the rules committee of the United States Senate to urge the passage of the Nolan bill to ameliorate conditions in the Patent Office as follows: James Hartness, Dr. W. F. M. Goss, E. M. Herr, Henry Hess, George M. Bond, A. M. Hunt, Spencer Miller, George Gibbs, F. J. Cole, Charles Whiting Baker and Charles T. Main.

In the interest of the metric system the Société des Ingénieurs Civils de France asked the society to further the passage of the compulsory metric system bill, and in reply President Fred J. Miller of the society was directed to say, among other things, that "the prevalent sentiment is still strongly against the compulsory adoption of the system."

## Gear Manufacturers' Meeting at Detroit

Standardization in the manufacture of gears is one of the important subjects to be discussed at the fourth annual meeting of the American Gear Manufacturers' Association, to be held in the Hotel Statler, Detroit, April 29 and 30 and May 1. An entire day of the convention will be devoted to the various phases of this subject and reports will be given by committees which have had it under consideration for months.

The program includes papers on "Gears from a Purchaser's Standpoint," by D. G. Stanbrough, Packard Motor Car Co.; "Routing of Gears and Machine Parts Through the Factory," by J. A. Urquhart, Brown & Sharpe Mfg. Co.; "The Science of Manufacturing,"

by Henry M. Leland, president of the Lincoln Motors Co.; "Problems of the Gear User," and "Mill Gearing from the User's Standpoint." A visit will be made to the plant of the Ford Motor Co. The annual A. G. M. A. banquet will be held on Friday evening, April 30, at which F. W. Sinram, president of the association, will act as toastmaster. The principal speakers will be Edgar A. Guest of the *Detroit Free Press*, and Henry M. Leland.

## Slight Advance in Refractories

Some manufacturers of refractories in Pittsburgh and other districts, have made slight advances in the prices of a few grades of refractories, effective from April 1. The manufacturers report heavy demands for refractories, and say they have been hampered in shipments by the scarcity of box cars. To overcome this as far as possible, some buyers are allowing shipments to be made in open cars, the buyers assuming all risks in transportation. Prices on different grades of refractories in effect from April 1 are as follows:

Fire Clay Brick, First Quality, Per 1000, f.o.b. Works	
Pennsylvania .....	\$45.00 to \$50.00
Ohio .....	41.00 to 45.00
Kentucky .....	41.00 to 45.00
Illinois-Missouri .....	35.00 to 40.00

Fire Clay Brick, Second Quality, Per 1000, f.o.b. Works	
Pennsylvania .....	\$30.00 to \$35.00
Ohio and Kentucky .....	25.00 to 35.00
Illinois-Missouri .....	30.00 to 35.00

Silica Brick, Per 1000, f.o.b. Works	
Pennsylvania .....	\$45.00 to \$50.00
Chicago .....	50.00 to 55.00
Birmingham .....	46.50 to 51.50

Magnesite Brick, Per Net Ton	
9 x 4½ x 2½ .....	\$85.00 to \$90.00

Chrome Brick, Per Net Ton	
9 x 4½ x 2½ .....	\$80.00 to \$90.00

Bauxite Brick, Per Net Ton	
55 per cent .....	\$40.00 to \$45.00 base
76 per cent .....	100.00 base

## Will Prosecute Profiteers

WASHINGTON, April 6.—Lifting of the Government coal price restrictions on April 1 and consequent increases in price to cover wage advances has caused the Department of Justice to send instructions to District Attorneys throughout the country to prosecute coal operators or dealers who may appear to be guilty of profiteering. The coal operators, while admitting that some increase is necessary, declare that they are seeking to keep it down to the lowest point possible.

Reports of the Geological Survey show an increase of 7 per cent in the production of beehive coke during the week ended March 27. The total output is estimated at 501,000 net tons, as compared with 467,000 tons during the preceding week. This was the largest tonnage reported in any week since February, 1919. The cumulative production since the beginning of the year is now 5,494,000 tons. Compared with the corresponding period of 1919, this is a decrease of 392,000 tons, or 7 per cent.

## Expelled by Engineers

At its regular business meeting, the Pittsburgh Chapter of the American Association of Engineers, by an overwhelming majority, voted to expel one of its members because of his connection with the draughtsman's union. The attitude taken was that while the Pittsburgh Chapter of the American Association of Engineers had no quarrel with the labor unions, as such, its members could not possibly live up to the ideals of the association, which believes in co-operation between labor and employer, and at the same time uphold the ideas of trade unionism.

The Bethlehem Fabricators, Inc., Bethlehem, Pa., established a new fabricating record in March with a tonnage of 3484. In celebration of this and as a farewell to D. H. Brillhart, who resigned to become a member of the firm of Brillhart & Bros., a banquet was served to heads of departments and foremen.

## NEW SHEET CAPACITY

### Newton Steel Co. Starts Four Hot Mills—The Plants of the Mahoning Valley

Production started this week at the sheet mill plant of the Newton Steel Co., Newton Falls, Trumbull county, when four hot mills were put in commission. The remaining four mills of the original installation will get under way later in the month. Rolls were turned over for the first time April 2 in presence of President Edward F. Clark, directors and officials of the company. The powdered coal department for heating the furnaces was put in operation April 3. The output of the plant is sold well into the future and steady operations are therefore assured. Production at the start will consist chiefly of highly finished sheet steel for automobiles.

The Newton mills will be entirely electrically driven. The plant represents an investment of about \$2,000,000. Well known steel interests in the Mahoning Valley are back of the undertaking. President Clark was formerly president of the Liberty Steel Co., absorbed by the Trumbull Steel Co., Warren, Ohio. It is the only steel plant in Newton Falls and the starting of the mills was made a semi-holiday.

The Newton Steel Co. is the second new sheet producer in the Youngstown district to get under way this year, the other being the Falcon Steel Co., which rolled its first output at its Niles, Ohio plant in March. Because of the high cost of materials and labor, the new plants are among the most expensive of their type and size built in this country.

### Dominion Steel Corporation Activities

The Dominion Steel Corporation will put its bar mill at Sydney, N. S., in operation immediately. The mill has not been operating for several months, owing to scarcity of orders for bars, but the company has received sufficient domestic orders, it is understood, to warrant it starting the mill again. Workmen are now engaged making repairs and overhauling the machinery.

The company has about finished rolling the 7500-ton rail order for the Roumanian government, and as no other orders for rails are offering at present, it will be compelled to close down this mill for a short time. It is confidently expected that additional orders for rail will be booked in the near future and the mill started again. Workmen will be engaged in the course of a few days in giving the Bessemer furnace a complete overhauling. The bottom and sides will be newly relined, and the work will require about two months to complete. Upon the completion of the repairs it is hoped that business will have so improved that the furnace will be blown in. The 16-in. mill which has been operating on single shift since its starting some weeks ago, is being placed on double shift immediately.

### Slick-Knox Steel Co. Extensions

The Slick-Knox Steel Co. announces additional machinery installation and extensions to its plant at Wheatland, Pa., to cost \$200,000. With these improvements the company will be able to turn out daily 5000 automobile frames. About 700 men will be added to the force, which now numbers about 2500. To finance its improvement program, the company recently placed a limited amount of preferred stock on the market, which has been largely subscribed for in the Shenango Valley. The company was formed in June, 1919, purchased the Wheatland plant from the Blaw-Knox Co. and later absorbed the Hydraulic Drawn Forge Co. at Ellwood, Pa.

The new companies enhance the sheet productive capacity of the Mahoning Valley, which now has a total of 125 hot mills, with a capacity of 3000 tons daily.

The Newton company is planning installation of additional units. The Republic Iron & Steel Co. is enlarging its sheet productive capacity at the DeForest works, Niles, over 100 per cent.

With 28 mills the Brier Hill Steel Co. is the prin-

cipal sheet producer in the district and one of the largest independents in the country. Its yearly capacity in sheets is approximately 240,000 tons. It operates 12 mills at the Thomas works and eight at the Empire works, both at Niles, and eight at the Western Reserve works, on the outskirts of Warren.

Other sheet makers in the district are the Youngstown Sheet & Tube Co., Sharon Steel Hoop Co., Mahoning Valley Steel Co., Trumbull Steel Co., and the Republic Iron & Steel Co. At Farrell, Pa., the American Sheet & Tin Plate Co. has eight mills.

The aggregate sheet steel capacity of the district is estimated at 900,000 tons annually. In addition there are 99 tin plate mills in this territory, 21 operated by the Trumbull Steel Co. at the Trumbull works; eight by Trumbull Steel Co. at the Liberty works and 70 by the American Sheet & Tin Plate Co., Steel Corporation subsidiary, divided between its Farrell, Pa., and New Castle, Pa., plants.

### Massachusetts Iron & Steel Co. Acquires Danvers Iron Works

The Massachusetts Iron & Steel Co., Danvers, Mass., incorporated with a capital of \$500,000, has acquired the property of the Danvers Iron Works together with the good-will and business of the Sylvester Co. The Danvers Iron Works was originally established in 1795 and has been in control of the Sylvester family for more than 50 years.

The new owners of the property, in the words of Governor Coolidge, "Have faith in Massachusetts," and propose to retain for the benefit of Massachusetts and other New England States' industries a large quantity of steel that is available for immediate consumption.

Carl P. Dennett, Griffin Wheel Co. is the president of the Massachusetts Iron & Steel Co., and Harry F. Stimpson, president Wheelock, Lovejoy & Co., is treasurer. H. W. Sylvester, who has been superintendent of the Danvers plant for many years, will remain with the new company, as will also A. J. Richards, cashier, and John McCauley, in charge of the coal department.

Alterations and repairs are already under way, and as soon as these are completed, the works will start with a full complement of men, and expects to turn out 50 tons or more of steel per day, together with large quantities of bolts, nuts, railroad spikes, etc.

One of the vice-presidents of the new company will be Charles S. Clark, for many years New England sales agent for the Pennsylvania Steel Co.

### Steel Treathers' Societies Merged

The American Steel Treathers' Society and the Steel Treathers' Research Society will be merged into a new organization to be known as the American Society for Steel Treating. The consolidation of the two societies was first approved by the board of directors of each organization and then submitted to the membership of each and the members have almost unanimously endorsed the merger. The American Steel Treathers' Society has 17 chapters and its headquarters are in Chicago. The Steel Treathers' Research Society with headquarters in Detroit has eight sections.

Officers for the new society have been nominated by a committee consisting of two members of each society and one outsider. Details of the amalgamation are being worked out, but it is probable that the formal merger of the two societies will not take place until after the annual convention of the American Steel Treathers' Society which will be held in Philadelphia in September, arrangements for which have already been made.

### Southern Pacific to Make Electric Steel

The Southern Pacific Railroad will begin operations in its new steel foundry in connection with its shops at Sacramento, Cal., by the middle of April. This is said to be the first step in the general enlargement of the plant. A 6-ton Heroult electric furnace has been installed and another will be bought later.



# Machinery Markets and News of the Works

## RAILROAD LIST OUT

### Chicago, Burlington & Quincy Wants Nearly 100 Machines

#### Machine Tool Trade Continues Fairly Active, March Sales Having Been Generally Good

The Chicago, Burlington & Quincy Railroad has issued at Chicago a list calling for quotations on nearly 100 shop tools, which will involve an expenditure of about \$275,000. Other railroad business is in prospect, but little is being closed. The New York Central is figuring on fairly large requirements, but it may be some time before an inquiry is issued. The Atchison, Topeka & Santa Fe has bought a few machines at Chicago and the Maine Central has bought in a small way at Boston. There have been other purchases of single tools or small lots by other roads, but no buying of size.

March business was fairly good in all machine-tool selling centers, much better, in fact, than was

anticipated, as indications during the first half of the month indicated a pronounced falling off in demand, but this was made up in the latter half of the month.

There are a few more price advances, and, according to some in the trade, there are prospects that further advances will be announced in the near future. In one of the large machine-tool manufacturing districts machinists are about to demand higher wages May 1, and if the advance is granted it probably will result in higher selling prices for tools.

Export trade shows some improvement. Cincinnati machine-tool builders report having received orders within the past week from Japan, England and South America.

Among the more important domestic inquiries now before the trade are a list of 75 to 100 tools from the Van Sicklen Speedometer Co., Toledo, Ohio, and Newark, N. J., and a list of about 20 large tools wanted by the American Steel & Wire Co. for its Cuyahoga works, Cleveland. The General Electric Co. continues to buy for nearly all of its plants, but particularly for its newly acquired plant at Bridgeport, Conn.

## New York

NEW YORK, April 6.

Machine-tool orders are being placed in fairly good volume, the General Electric Co. continuing as one of the principal buyers. The Van Sicklen Speedometer Co. has issued inquiries for 75 to 100 tools for its Toledo, Ohio, and Newark, N. J., plants. Most of the company's requirements will probably be filled by used tools. The Nathan Mfg. Co., New York, continues to buy. The Federal Shipbuilding Co., Kearny, N. J., bought a number of tools last week. The Otis Elevator Co., which some weeks ago issued a fairly large list, has bought a considerable number of used tools. The Hyatt Roller Bearing Co., Harrison, N. J., which is building an addition, is expected to come into the market for new equipment. The White-Gans Corporation, 11 Broadway, New York, which is building a ship repair plant in New Jersey, is expected to buy shop equipment. The Simms Magneto Co., East Orange, N. J., has bought a few tools.

Railroad business has not come up to expectations. The New York Central is figuring on a list of tools, but it may be some time before the inquiries are issued.

Deliveries on most standard tools are getting further off. The prospect of further price advances is also adding to the perplexities of buyers. A manufacturer of turret lathes has advanced about 5 per cent and some of the drill manufacturers are making sales for forward delivery subject to a possible 10 per cent price advance.

There is a noticeable decline in the number of crane inquiries, most of which are for those of small capacity. The Worth Steel Co., Claymont, Del., will probably be in the market soon for a charging crane. The Nichols Copper Co., Laurel Hill, L. I., has purchased the remainder of the cranes for which it was recently in the market, from the Columbia Hoist & Machine Co., Long Island City, N. Y. The purchase includes six 5-ton, 18-ft. 6-in. span, overhead traveling cranes and four transfer cranes of sufficient capacity to carry the 5-ton cranes loaded. The inquiry of the American Brake Shoe & Foundry Co., New York, is livening up.

Among recent inquiries are: Dreyfus Brothers, 29 Broadway, one 8-ton overhead traveling crane for export; the Midvale Steel & Ordnance Co., Philadelphia, three 10-ton overhead traveling cranes; the Newburgh Shipyards, Inc., two 5-ton and one 10-ton overhead traveling cranes.

Crane purchases include a 20-ton, 50-ft. boom, 8-wheel locomotive crane by Henry R. Kent & Co., New York, from the Ohio Locomotive Crane Co.; Charles E. Burd, Red Bank,

N. J., a second-hand Brownhoist locomotive crane, 15-ton, 38-ft. boom; the Worcester Electric Light Co., Worcester, Mass., a 20-ton, 8-wheel locomotive crane, and the Maine Central Railroad, Portland, Me., a 20-ton, 8-wheel locomotive crane from the Browning Co., Cleveland; the Foundation Co., New York, a 10-ton, 60-ft. span, overhead traveling crane for the plant of the Dunlop-America Co. from the Whiting Foundry Equipment Co.; the Titusville Iron Works, Titusville, Pa., two 5-ton, one 15-ton and one 20-ton overhead traveling cranes from the Shaw Electric Crane Co.; the Bridgeport Screw Co., Bridgeport, Conn., one 4-ton and one 4½-ton, both 19-ft. span, three motion jib cranes from the Shepard Electric Crane & Hoist Co.; and H. D. Best & Co., New York, six 2-ton, 16-ft. 11-in. span, one motor, overhead traveling cranes for the American Machine & Foundry Co., Brooklyn, from the Shepard Electric Crane & Hoist Co.

The Interstate Auto Parts Co., New York, has been incorporated with a capital stock of \$20,000 by S. Furer, M. M. Bernstein and N. Cherof, 351 St. Nicholas Avenue, to manufacture metal products.

The Tremont Tool & Die Corporation, New York, has been incorporated with a capital stock of \$50,000 by J. O. Humphrey, T. Hansen and V. K. Smith, 20 Broad Street, to manufacture tools, dies, machine parts, etc.

The AA Wire Co., 50 East Forty-second Street, New York, manufacturer of wire products, has increased its capital stock from \$100,000 to \$800,000.

The Driggs Ordnance & Mfg. Corporation, New York, has been incorporated with an active capital stock of \$275,000 by E. R. Kinkel, F. E. Vans and J. J. Schulman, 25 Post Avenue, to manufacture iron and steel products.

The George F. Foss Machinery Co., New York, has been incorporated with a capital stock of \$50,000 by G. B. Foss, J. B. Smythe, and H. Bramwell, 34 Nassau Street, to manufacture machinery and parts.

The New Jersey Pulverizing Co., 15 Park Row, New York, is having plans prepared for three additions to its plant at Vineland, N. J., 44 x 110 ft., 32 x 48 ft., and 16 x 30 ft., respectively, with cost estimated at \$50,000.

The Economic Iron Works, Utica, N. Y., has increased its capital stock to \$50,000.

The Acme Phonograph Motors Corporation, New York, has been incorporated with a capital stock of \$100,000 by C. P. Evans, F. H. Hedinger and M. Samuels, 6 East Sixteenth Street, to manufacture motors for talking machines.

The Progressive Corrugated Paper Machinery Co., Brook-

lyn, has been incorporated with a capital of \$10,000 by W. F. and L. H. Schroeder and J. Linskila, 37 Bartlett Street, to manufacture special machinery.

The Studebaker Corporation, 1751 Broadway, New York, manufacturer of automobiles, is having plans prepared by Architects Tooker & Marsh, 101 Park Avenue, for its proposed new three-story service building and repair works, 68 x 95 ft., at Sterling Place and Bedford Avenue, Brooklyn.

The Brown-Spin-Wright Corporation, New York, has been formed by a consolidation of the Brown, Spin, Wright Co., the Brown, Spin, Wright Cotton Co., and the Brown, Spin, Wright Construction Co., with capital stock of \$500,000, by W. H. Collins, A. W. Fiedler and A. H. Goodhue, 42 Broadway, to manufacture textile machinery.

The A. H. Wolff Gas Radiator Co., 4 Great Jones Street, New York, manufacturer of radiators, etc., has increased its capital stock from \$20,000 to \$50,000.

The Weber Electric Co., Campbell Avenue and Olean Street, Schenectady, N. Y., manufacturer of electrical specialties, has completed plans for a two-story addition, 65 x 100 ft., to cost about \$25,000.

The Mulholland Machinery Corporation, New York, has been incorporated with a capital stock of \$25,000 by F. R. Wood, D. Olena and J. P. Mulholland, 128 West Sixty-sixth Street, to manufacture machinery and parts.

The McPhilliben Light Fixture Co., 264 Fulton Street, Jamaica, L. I., manufacturer of metal lighting fixtures, is considering plans for a two-story, reinforced-concrete addition to cost about \$40,000.

The Bayles Shipyard, Port Jefferson, L. I., has been acquired by the New York Harbor & Dry Dock Co., New York, from the United States Shipping Board for a consideration of about \$2,025,000. This property was disposed of some months ago to A. P. Allen at a price of about \$2,000,000, but upon failure of the purchaser to complete the terms of the contract the yard reverted to the board. The new owner plans to operate the property, and vessels now under construction are included in the sale.

The Kny-Scheerer Corporation, 404 West Twenty-seventh Street, New York, has been incorporated with an active capital of \$1,000,000 to manufacture surgical instruments. J. J. Dray and J. J. Flynn are the incorporators.

The Norma Co. of America, 1790 Broadway, New York, manufacturer of ball, roller and other bearings, with plant on Anable Avenue, Long Island City, has increased its capital stock from \$300,000 to \$750,000.

A one-story mechanical works addition, 60 x 95 ft., to cost about \$40,000, with equipment, will be erected by the Diana Paper Co., Harrisville, N. Y.

The proposed new service building and repair works of the Standard Steel Car Co., automobile department, 1920 Broadway, New York, at Long Island City, will be erected by the Midwood Building Corporation, 44 Court Street, Brooklyn, and occupied under lease. It will be five stories, of reinforced-concrete, and will cover an area of about 30,000 sq. ft. on South Jane Street. It is estimated to cost about \$500,000.

The Clayton Ship & Boat Building Corporation, Clayton, Jefferson County, N. Y., has been incorporated with a capital stock of \$250,000 by E. A. McDonald, C. R. Chapman and C. J. Parker, Jr., Syracuse, N. Y.

The Miranda-Henson Co., New York, has been incorporated with a capital stock of \$50,000 by I. J. and A. J. Miranda, Jr., and H. D. Henson, 511 West 144th Street, to manufacture machinery.

The Stutz Motor Car Co. of America, 37 Wall Street, New York, has filed notice of increase in active capital stock from \$500,000 to \$600,000.

A new one-story plant, 120 x 300 ft., to cost about \$250,000 with machinery, will be erected by the Albany Perforated Wrapping Paper Co., 547 Greenwich Street, New York, in the Lumber district, Albany. Plans have been completed.

The Raymond Engineering Corporation, 305 Lafayette Street, New York, has increased its capital from \$150,000 to \$400,000.

The General Electric Co., Schenectady, N. Y., has issued a formal notice disclaiming any interest, financial or otherwise, in the Steinmetz Electric Motor Car Co., 512 Fifth Avenue, New York, recently organized by Charles P. Steinmetz, chief consulting engineer for the company, and associates. The Steinmetz company is capitalized for \$2,000,000. It will specialize in the production of an electric-operated motor truck, generating its own current while in service. The company plans for the establishment of works at Baltimore. J. P. Story, Jr., is chairman of the board.

The Mura Motors Corporation, New York, has been incorporated with an active capital stock of \$220,000 by G. W.

Rollo, E. F. Hills and D. Robinson, 154 Nassau Street, to manufacture automobile engines.

The Burns Dental Casting Machine Co., New York, has been incorporated with a capital stock of \$150,000 by G. F. and J. E. Burns and J. J. Sullivan, Flushing, L. I., to manufacture special machinery.

The Alsen Cement Co. of America, 30 East Forty-second Street, New York, has filed notice of reorganization with active capital stock of \$2,500,000.

The Kennedy Valve Co., East Water Street, Elmhurst, N. Y., manufacturer of valves and other power specialties, is considering plans for a one-story addition to be used as a brass foundry.

The Fulton Motors Corporation, 34 Pine Street, New York, recently organized to take over the property and assets of the Fulton Motor Truck Co., with plant at Farmingdale, L. I., has been incorporated in Delaware with capital stock of \$36,150,000. Garvin Denby is president and general manager.

The Standard Mechanical Equipment Co., New York, has been incorporated with a capital stock of \$25,000 by W. and J. K. Evans and W. B. Connor, 90 West Street, to manufacture metal specialties.

The Starobin Electrical Supply Co., 101 Fourth Avenue, New York, manufacturer of electrical specialties, has increased its capital stock from \$30,000 to \$100,000.

The Board of Public Works, South River, N. J., will receive bids up to 8 p. m., April 12, for its proposed one-story municipal electric power plant, 59 x 78 ft., to cost about \$125,000, including equipment. Goss, Bryce & Johnson, 53 Liberty Street, New York, are the engineers.

The Simms Magneto Co., North Arlington Avenue, East Orange, N. J., manufacturer of magnetos and ignition systems, has awarded a contract to the American Concrete-Steel Co., 27 Clinton Street, Newark, for a two-story addition, comprising two additional stories, to its present plant, 177 x 231 ft., with extension, L-shaped, 67 x 153 ft., to cost about \$385,000, including equipment.

The Ocean County Electric Co., Toms River, N. J., has completed plans for the erection of a new hydroelectric power plant in this section, to cost about \$500,000, including equipment.

The Humbert Toymakers, Inc., Montclair, N. J., has been incorporated with a capital stock of \$50,000 by Albert W. Pease, Albert R. Philbrick and David W. Dewar, to manufacture mechanical toys, etc.

The Yale Piston Ring Co., 560 West Thirty-sixth Street, New York, is planning for the early occupancy of its new plant on Myrtle Avenue, Boonton, N. J., now practically completed. During the spring and summer it contemplates the erection of four additional buildings at this location.

The Franklin Appliance Co., Elizabeth, N. J., has been incorporated with a capital stock of \$50,000 by C. L. Higsby, Frank and A. D. Stout, Plainfield, to manufacture electrical devices.

The United States Battery Co., Passaic, N. J., has been incorporated with a capital stock of \$200,000 by Joseph J. Flood, Aaron L. Simon and Mortimer R. Simon, to manufacture electric batteries.

The Standard Oil Co., Constable Hook, Bayonne, N. J., has filed plans for a can shop addition to its plant to cost about \$115,000, including equipment.

Involving a consideration said to be about \$2,000,000, the Lord Dry Dock Co., a subsidiary of the Lord Construction Co., 105 West Fortieth Street, New York, has acquired about 3000 ft. of Hudson River water front property at North Bergen and Guttenberg, N. J., as a site for its proposed shipbuilding and repair works. The affiliated organization was recently incorporated with a capital stock of \$20,000,000 under Delaware laws, forming a merger with the Weehawken Dry Dock Co., Weehawken, N. J. The new plant is estimated to cost close to \$5,000,000.

The Klaxon Co., 194 Wright Street, Newark, N. J., manufacturer of automobile horns, has abandoned plans temporarily for the construction of a new plant estimated to cost about \$1,000,000, owing to present building costs. To allow for necessary increased production before the new plant is erected, the company has arranged to occupy two of the main buildings at the works of the General Motors Corporation, Grove Street, Bloomfield, N. J., formerly the plant of the International Arms & Fuze Co. The structures will provide about 260,000 sq. ft. of manufacturing space and considerable equipment from the Wright Street works will be removed to this location. The present plant ultimately will be closed. Duncan A. McConnell is president.

Blau Service, Inc., Newark, N. J., has been incorporated with a capital stock of \$125,000 by Edward Blau and Ellis J. Cook to manufacture electrical appliances.

The Clox-Lite Mfg. Co., 24 Scott Street, Newark, recently

organized to manufacture automatic controller devices for automobile lighting systems, is arranging for an increase in its capital stock to \$500,000 for enlarged production. Werner O. Olson is president and George L. Hall, general manager and secretary.

The Kwickstart Spark Plug Co., Newark, N. J., has been incorporated with a capital stock of \$125,000 by John W. Ekstedt, Bernard J. and John Commings, to manufacture spark plugs.

The Day-Elder Motors Corporation, 20 Coit Street, Irvington, N. J., has awarded contract to the New Jersey Concrete Construction Co., 365 Park Avenue, Newark, for a four-story addition to its motor truck plant, 75 x 262 ft., at Clinton Avenue and Twenty-third Street.

The New Jersey Lamp Works, Newark, N. J., has been incorporated with a capital stock of \$125,000 by Ascher Herman and Maurice S. Maurer to manufacture electric lamps.

The Forged Steel Products Co. of New Jersey, Newark, has been incorporated with a capital stock of \$200,000 by John H. Gibson, Horace G. Oliver and Lionel L. Meyers, to manufacture steel forgings and similar products.

The Royal Brass Foundry Co., 39 New York Avenue, Newark, N. J., has filed notice of organization. August C. Fuchs, 304 Oliver Street, heads the company.

The Ignition Specialty Co., 125 West Fifty-first Street, New York, has leased the two-story building adjoining its works at 123 West Fifty-first Street, for extensions. Otto R. Gischow is president.

The United Mechanics Sheet Metal Works, New York, has been incorporated with a capital stock of \$10,000 by C. Halpern, S. Hornstein and S. Wurman, 503 Prospect Avenue, to manufacture sheet-metal products.

The Chevrolet Motor Co., Broadway and Fifty-seventh Street, New York, has leased the four-story building at 248-50 West Sixty-third Street, for a new service and repair works.

## New England

BOSTON, April 5.

March proved a better month in the machine tool market than was anticipated, the average total bookings being on a parity with those for January, but smaller than February, which was the best month in the history of the local trade. So far this month a falling off in new orders is noted, but there is enough buying against old specifications to make the market fairly active. With few exceptions, however, purchases have been for one, two or three machines. The General Electric Co., Lynn, which has been the most important factor in the market, has not been buying much of late. Some of the large lists which were expected to be offered during the first quarter of 1920 apparently have become obsolete, the Worthington Pump & Machinery Corporation and the Amoskeag Mfg. Co. lists being two cases in point. The United Shoe Machinery list is still pending, but is said to have been held up by the absence of an official who is in the South.

No important price changes are noted. The general opinion is that the peak has been reached, although advances in hand screw machines are looked for in the near future. Production costs are such, however, that no material lowering of values is anticipated for a long time.

Second-hand machines continue in demand, especially the standard makes of lathes, and prices hold very firm. At the Watertown Arsenal, Watertown, Mass., a large amount of salvage machine shop equipment is being set up in a shed for the purpose of establishing an apprentice school for Government machine shops. Some of the equipment, notably lathes and boring mills, is in original crates. The arsenal is an active buyer of parts and attachments for some of the equipment in the school and other departments.

The Maine Central Railroad has again figured in the buying, taking miscellaneous tools for machine shop and round-house service, and the Morgan Construction Co., Worcester, Mass., contracted for one 50-in. duplex horizontal boring machine, one 53-in. and one 62-in. vertical boring mill. The Newport Torpedo Station, Newport, R. I., has covered its 1920 list. Among those who placed orders for lathes the past week are the W. H. McElwain Co., Manchester, N. H.; shoes; Whiting & Davis, Plainville, Mass., silver, etc.; and Thompson Spa, Boston, restaurant, the latter for an 18-in. geared head motor-driven lathe for its machine shop. A good demand is noted for auxiliary and second operation machines for work after it comes from automatics. The call for screw machines, however, has slowed up considerably. It is interesting to note that manufacturers of machine screws' advanced prices the closing days of March and are all far behind on deliveries. The Morse Twist Drill & Machine Co., New Bedford, Mass., has just bought shapers

and is still in the market for various automatic machines. The American Rubber Co., Cambridge, Mass., purchased a shaper and lathe and is interested in other tools. It is replacing equipment which has been in use several years. A Readville, Mass., loom plant, which was considerably enlarged last summer, may undertake further additions and is asking specifications on several tools. The Saco-Lowell Works, Boston, has not yet completed its 1920 list, having inquiries out on several tools. The H. H. Arnold Co., Rockland, Mass., milling machine cutters, reamers, etc., is figuring on the erection of a new plant and is asking for prices and circulars on miscellaneous equipment. The same interest, whose name is withheld and who last week bought 44 lathes, is about to close on a number of other machines. The Fisk Rubber Co., Chicopee, Mass., is making inquiries on miscellaneous equipment.

The Stevens-Duryea Co., Chicopee Falls, Mass., states that while it was active in the matter of getting the Rauch & Lang plant to locate in Chicopee Falls, there is no connection between the two companies. Paul A. Frank, formerly of Chicago, is president of Rauch & Lang and is a stockholder and director of the Stevens-Duryea Co. Ray S. Deering is president of Stevens-Duryea Co. and has no connection with Rauch & Lang. The companies are occupying different plants.

The local crane market has been quiet. The Worthington Pump & Machinery Corporation is reported as still interested in a 7½-ton crane.

The Grow Tire Co., Canton, Mass., is figuring on plans for a new plant, the cost of which may exceed \$1,000,000.

The Beaudet Mfg. Co., Woonsocket, R. I., welding torches, operating in experimental quarters, is contemplating the erection of a larger plant.

Worcester and Framingham, Mass., interests have bought a large tract of land in Worcester upon which an auto body manufacturing plant, to cost about \$1,000,000 and employing about 4000, will be erected this summer.

The Hampden Toy Co., Franklin Street, Westfield, Mass., has bought the four-story brick building on Elm Street, formerly occupied by William Provin, manufacturer of whips, which it will equip for toy making.

Stockholders of the J. R. Montgomery Co., Windsor Locks, Conn., metal thread, etc., have authorized an increase in the capitalization of \$350,000 to provide funds for a new plant on the site of the Anchor paper mill, burned several years ago.

Plans are being drawn for another addition to the plant of the Tremont Mfg. Co. in Roxbury, Boston, which will be three stories, 40 x 240 ft. The company specializes in pipe cutters, wrenches, etc.

Plans are being prepared for a two-story brick building, 22 x 50 ft., on Congress Avenue, New Haven, Conn., near Cedar Street, for James Averillo and James Maister, who will manufacture pocket knives and cutlery.

The Remo Mfg. Co., Meriden, Conn., specialties, will add two floors to its plant, doubling its floor space. It has been increased five times during the past two years. About 100 are employed.

The Wico Electric Co., Springfield, has incorporated under Massachusetts law to manufacture magnetos, storage batteries, ignition equipment and specialties in its West Springfield plant. It is capitalized at \$400,000. Phelps Brown, 44 Avon Place, is president; Arthur W. Lamson, vice-president and Edward L. Stoughton, treasurer.

The Monarch Mfg. Co., Meriden, Conn., has been organized by F. H. Perry and R. C. Cossette to manufacture metal specialties.

The Fales & Jenks Machine Co., Pine and Dexter streets, Pawtucket, R. I., will build a two-story addition, 25 x 25 ft.

Fire, March 30, destroyed a section of the plant of the Somersworth Foundry Co., Salmon Falls, N. H., with loss estimated in excess of \$50,000.

The Sexton Can Co., 228 Franklin Street, Boston, has awarded a contract to F. C. Alexander, Old South Building, for the erection of the three-story addition to its plant at Everett, 80 x 120 ft., estimated to cost about \$120,000, including equipment.

The Philbrick-Booth Foundry Co., Hartford, Conn., has increased its capital stock from \$20,000 to \$70,000.

A new power plant to cost about \$200,000, with equipment, to be used for works service, will be erected by the Duane Sugar Refining Co., Stamford, Conn.

The Draher Machine Co., 70 North Elm Street, Waterbury, Conn., recently incorporated with a capital of \$25,000, has been organized with John Draher as president and treasurer; Frank Meseros, vice-president; and John Galat, secretary. It will manufacture machinery and parts.

The Greyhound Motor Car Corporation, East Warren, R. I., has acquired a local site for the erection of an auto-



mobile manufacturing plant. The initial building will be 60 x 200 ft.

The Peck Spring Co., Plainville, Conn., has been organized to manufacture springs and other metal specialties. D. C. Peck is president, and D. K. Peck, treasurer.

The H. B. Smith Co., 57 Main Street, Westfield, Mass., manufacturer of boilers and boiler equipment, has awarded a contract to P. J. Mahoney, 26 Orange Street, for the erection of a one-story brick and concrete addition, 80 x 210 ft., to cost about \$45,000.

The S. K. F. Ball Bearing Co., 330 New Park Avenue, Hartford, Conn., has awarded a contract to the J. H. Grozier Co., 721 Main Street, for a one-story addition, 50 x 153 ft., to cost about \$25,000.

The Tobacco Machinery Co., South Beach, Conn., has been incorporated in Delaware with capital of \$100,000 by D. A. Woodcock, H. M. Smith and L. A. Watson, South Beach, to manufacture special machinery.

The Gilbert & Barker Mfg. Co., Springfield, Mass., manufacturer of oil and gas furnaces, pumping machinery, etc., has awarded contract to Tucker & Lewis, 101 Park Avenue, New York, for the erection of additions to its plant to cost about \$1,000,000, including equipment. The buildings will comprise a two-story main manufacturing works, 164 x 180 ft.; two-story foundry, 80 x 400 ft.; one-story testing works, 63 x 140 ft.; sand blast building, 30 x 54 ft.; one-story engine plant, 41 x 72 ft.; one-story boiler plant, 52 x 92 ft.; and a number of other buildings for executive and welfare service.

Plans are being prepared by Architects Frost & Chamberlain, Slater Trust Building, Worcester, Mass., for the proposed addition to the plant of the Union Twist Drill Co., Athol, Mass., to be four stories, 60 x 200 ft., and estimated to cost \$150,000.

The Groton Shipyard, Groton, Conn., formerly the property of the Groton Iron Works, has been acquired from the United States Shipping Board by Charles W. Morse. Contracts now on hand will be completed, including six 8800-ton and three 9400-ton vessels.

## Philadelphia

PHILADELPHIA, April 5.

Philadelphia sellers of machine tools are somewhat concerned because of the mounting prices of new tools, which restrict the volume of their sales. Dealers in second-hand machinery say they are benefiting by high prices and long deliveries on new tools since users of machinery are now turning to second-hand tools. A Central Western maker of lathes and screw machines advanced its prices 5 per cent Wednesday of last week, making a raise of about 18 per cent over peak prices during the war. This level is typical of conditions throughout the trade. Makers of machinery justify the advances because of the higher costs of labor.

News came out last week of the formation of a corporation to establish a large ship repair plant at Camden, N. J., with three drydocks, 8000, 4000 and 2500 ft., the plant to absorb the site of the Delaware River Shipbuilding & Repair Co. It will be equipped with electric power and modern shops. The first dock will be completed this summer. Barclay Johnson, a Philadelphia shipping man, is prominently identified with the new corporation.

Among recent inquiries are those of the Cambria Steel Co. for lathes, wheels, presses, open side planer, hydraulic presses and key seaters for the Johnstown plant; Bartlett, Hayward & Co., Baltimore, heavy duty punch press; South Line Steamship Co., Savannah, Ga., lathes, slotters, hydraulic presses and boring mills; General Electric Co., press, machines of this kind being difficult to obtain for less than six or eight months' delivery.

Among the new metal-working industries are the Allison Steel Products Co., Chester, Pa., which will make steel windows, and an unnamed company in Harrisburg, which will make automobile frames and will need hydraulic machinery. The DuPont Motor Co., which moved from Wilmington, Del., will make pleasure cars at Moore, Pa., and has been buying equipment; the Fox Motor Co., which will make pleasure cars, has increased its capitalization to \$1,250,000, three-quarters of which has been floated. A site for the plant has not yet been announced. It is reported a new concern will make reamers near Philadelphia.

Among recent purchases are: Sheet working machinery by the Westinghouse Electric & Mfg. Co.; lathes by the Landis Machine Co., the Landis Tool Co. and the Frick Co., harvesting machinery, all of Waynesboro, Pa.; 10,000 gages of various kinds to the Mercer Automobile Co., Trenton, N. J.; lathes, drill presses and wheel machines to the United States Cast Iron Pipe & Foundry Co. for one of its Southern plants.

The Abrasive Co., James and Fraley streets, Philadelphia, manufacturer of grinding wheels, etc., is having plans prepared for a new one-story power plant.

The Pennsylvania Gear & Machine Co., 435 North Broad Street, Philadelphia, has filed plans for a one-story addition on Tioga Street, near Janney Street, to cost about \$25,000.

The Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has acquired about 40 acres on Rising Sun Avenue, between Adams Avenue and the Philadelphia & Frankford Railroad, for the erection of a new plant, estimated to cost in excess of \$2,000,000. Details are now being arranged.

The Philadelphia Textile Machinery Co., Eighth Street and Tabor Road, Philadelphia, manufacturer of drying machinery, has filed notice of change of name to Proctor & Schwartz, Inc. It has broken ground for the erection of a reinforced-concrete addition to cost about \$185,000 including equipment.

The building of the General Electric Co., Marshall and Noble streets, Philadelphia, was partially destroyed by fire, March 28, with loss estimated at \$30,000.

The Universal Motor Co., Philadelphia, has awarded a contract to the Standard Construction Co., 1713 Sansom Street, for a two-story service building and repair works, 75 x 215 ft., at Thirty-fourth and Chestnut streets, to cost about \$125,000.

A two-story boiler plant, 48 x 107 ft., to cost about \$50,000, will be erected by the Notaseme Hosiery Co., Oxford and Mascher streets, Philadelphia. Plans have been completed.

The Philadelphia Storage Battery Co., Ontario and C streets, Philadelphia, has filed plans for alterations and improvements at its plant, replacing a recent fire loss, to cost about \$35,000.

The Automotive Equipment Co., Philadelphia, has leased the four-story building at 1225 Race Street, for the establishment of a new works.

Frederick Sabin & Co., Inc., 237 North Broad Street, Philadelphia, manufacturer of heating specialties, has had plans prepared for an addition to its plant at Eighteenth and Courtland streets.

W. H. Hoffman, Philadelphia, operating a sheet metal manufacturing plant on Baring Street, near Thirty-eighth Street, has filed plans for a one- and two-story addition, 79 x 83 ft., to cost about \$10,000.

A large electric traveling crane and other mechanical loading and unloading equipment will be installed on the new pier to be erected by the Harbor Commission, Camden, N. J., at the foot of Spruce Street, Delaware River. The work is estimated to cost close to \$500,000.

J. J. Steiner & Co., Inc., Trenton, N. J., has been incorporated with a capital stock of \$60,000 by Albert V. Bower, James E. Mitchell and Abram L. Fuld, to manufacture automobile parts and operate a machine and repair works.

Rebuilding plans are being considered by the Nearpara Rubber Co., North Olden Avenue and Prince Street, Trenton, N. J., for the replacement of its rubber reclaiming plant, destroyed by fire March 18, with loss estimated at \$90,000. This loss included about \$50,000 in new machinery recently installed. Hyman A. Rosenthal heads the company.

The Summerill Tubing Co., Bridgeport, Pa., is having plans revised for a two-story addition, 60 x 120 ft. Harry G. McMurtrie, 1012 Walnut Street, Philadelphia, is architect.

The T. B. Wood's Sons Co., Chambersburg, Pa., manufacturer of power transmission machinery, has completed plans for a one-story addition, 40 x 80 ft., with extension, 25 x 40 ft.

The Harrisburg Foundry & Machine Co., North Seventh Street, Harrisburg, Pa., is reported to be planning for the development of a department for the manufacture of textile and silk-making machinery. Production, heretofore, to a large extent has been devoted to iron and steel castings.

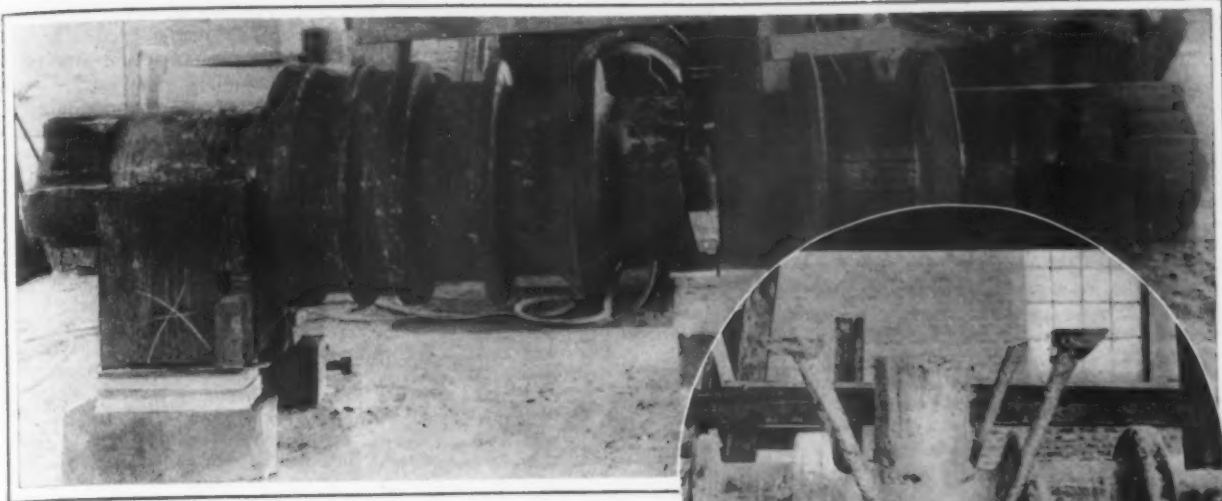
The Mount Union Refractories Co., Mount Union, Pa., has filed notice of issuance of \$300,000 in bonds for expansion work.

The Williamsport Wire Rope Co., Williamsport, Pa., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition, 100 x 340 ft.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is said to be planning for the erection of a group of new shops at Marietta, Pa., to cost in excess of \$2,000,000, including machinery.

The Carlisle Tire & Rubber Co., Carlisle, Pa., is planning for the erection of an addition at B and Factory streets, to cost about \$10,000.

The Landis Tool Co., Waynesboro, Pa., has arranged for the closing of its branch plant at Hagerstown, Md., about May 1, which was started about three years ago for the



The above illustration shows a large roll at the plant of the Cromwell Steel Co., Loraine, Ohio, which was welded by the thermite process in the middle pass at a location about 2 ft. in diameter. Three of these large rolls were broken and repaired. It was necessary to ram up the molding material very hard in order to avoid possibility of the large bulk of molten thermite steel, later poured into the weld, from escaping. Thorough preheating was another essential. Each of the three welds required about 2200 lb. of thermite and it was therefore necessary to suspend four crucibles with the extension rings over the mold.

production of war necessities. The machinery will be removed to the branch works at Greencastle, Pa., where additions recently have been completed. Operations will be concentrated at the latter plant, which is now giving employment to about 250 persons.

The Allison Steel Products Co., Chester, Pa., has been organized to manufacture metal sash doors, etc., the capital stock being \$5,000. The incorporators include Thomas W. Allison, Ridley Park, Pa.; Edwin D. Glaush and John J. McClure, Chester, the latter treasurer of the company.

The Pennsylvania Pump & Compressor Co., Easton, Pa., has been chartered under Pennsylvania laws to manufacture forgings, castings, tools machinery, etc. The capital stock is \$500,000 and the incorporators are Norman A. Messinger and Ward Raymond, Easton; William E. Anderson, Phillipsburg, Pa., and Ellis Snovel, Easton, treasurer of the organization.

The Berry Metal Co., New Brighton, Pa., capitalized at \$10,000, has been chartered to manufacture castings, machinery, etc. W. D. Berry, New Brighton, is treasurer and one of the incorporators. The other incorporators are W. V. Berry, New Brighton, and D. Lee McConaughy, Pittsburgh.

## Buffalo

BUFFALO, April 5.

The Art Works Shop, 700 Main Street, Buffalo, M. F. McFarland, president, has purchased a site at East Ferry Street, Chelsea Place and the New York Central Railroad Belt Line, and will erect a brick and steel factory for the manufacture of art hardware. The first unit will cost \$100,000. Other units will be added later.

The Daly Machine Co., Detroit, Mich., has purchased the Batavia Steel Products Corporation's plant at Evans Street, Batavia, N. Y., which it will equip as a branch plant. The Daly company manufactures a die-sinking, milling and churning machine and reports it has enough orders ahead to enable it to operate over a year.

The Ner-a-Car Corporation, Syracuse, N. Y., has been incorporated with an active capital stock of \$400,000 by J. L. Horan, J. Benders and D. Scanlon to manufacture automobile motors.

The Summit Foundry Co., 81 Middle Street, Geneva, N. Y., manufacturer of stoves, is considering the erection of a three-story foundry, 60 x 150 ft.

The American Radiator Co., 1809 Elmwood Avenue, Buffalo, has filed plans for the erection of a one-story brick and steel foundry addition to cost about \$25,000.

The Harvey-Hanes Machine Corporation, Buffalo, has been incorporated with a capital stock of \$50,000 by W. L. Marcy, L. E. Harmon and S. F. Carr, to manufacture machinery and parts.

The Hewitt Rubber Co., Kensington Avenue, Buffalo, manufacturer of air brake hose and other heavy rubber products, is planning for the erection of a two-story addition to cost about \$25,000.

The M. L. Oberdorfer Brass Co., 804 East Water Street, Syracuse, N. Y., has completed plans for the erection of a one-story foundry addition.

Fire, March 29, destroyed a foundry building at the plant of the Syracuse Alloy Steel Co., with loss of about \$10,000.

The Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of automobile motors, has increased its capital stock from \$1,000,000 to \$2,500,000. It is planning for increased production to practically double the output the past year, which totaled close to \$6,000,000 in valuation. T. R. Lippard is president.

The Sweet Brothers Foundry Co., Johnson City, N. Y., is planning for the erection of a one-story foundry, 160 x 200 ft., on Grand Avenue, to cost about \$60,000. A. J. Sweet heads the company.

The Atlas Crucible Steel Co., Dunkirk, N. Y., has acquired the city thoroughfares of West Newton Street and Atlas Avenue in the vicinity of its works to be used for extensions.

The Morrison Machine Products Co., Rochester, N. Y., has been incorporated with a capital stock of \$100,000 by W. F. O'Donnell, G. Reisinger and L. F. Morrison to manufacture machine specialties, parts, etc.

The Upson Co., Lockport, N. Y., manufacturer of fiber building board, has awarded a contract to the John W. Ferguson Co., United Bank Building, Paterson, N. J., for five one-story buildings to cost about \$275,000.

The Crouse-Hinds Co., Wolf and Seventh streets, Syracuse, N. Y., manufacturer of electrical specialties, will build a one-story foundry addition, 70 x 260 ft.

## Baltimore

BALTIMORE, April 5.

The Emery Steel Casting Co., Baltimore, recently incorporated, has taken title to property at Charles, Hanover and Barney streets, which will be equipped for the manufacture of special small steel castings. Plans are being made to remove the plant at Garrison Avenue to the new location.

The Campbell Metal Window Corporation, Scott and McHenry streets, Baltimore, has been incorporated with \$2,100,000 capital stock to manufacture all types of metal and wood windows, frames, etc. The incorporators are Jesse N. Bowen, Matthew Gault and William D. MacMillan. No announcement as to plans has been made.

The Wizard Check Indorser & Printing Machine Co., Bal-

timore, has leased space in the Kearney Building, Grant and Water streets, for the manufacture of a check indorser and printing machine.

The Prudential Oil Co., Curtis Bay, Baltimore, plans to build an additional shop, 72 x 129 ft., to cost about \$25,000.

The Globe Shipbuilding Co., which is erecting a plant at Fairfield, Baltimore, has received a large amount of machinery from the plant at Superior, Wis., which is being moved to the new location. Among buildings to be erected are a machine shop, plate and angle shop, joiner shop, mold loft and power house. It is expected that the plant will be ready for operation within a few months and about 1000 men will be employed. Benjamin F. Cooke is president.

An addition, 40 x 120 ft., to cost about \$35,000, will be built to the plant of the Rappahannock Electric Light & Power Co., Fredericksburg, Va.

The Walker Machine & Foundry Corporation, Roanoke, Va., has been organized and contemplates building a plant, 60 x 100 ft., to cost \$14,000. Charles M. Walker is president and Franklin Moore, secretary.

The Cherryville Foundry Co., Cherryville, N. C., manufacturer of gray iron castings, contemplates erecting a new foundry. C. C. Dellinger is manager.

The Du Pont Automobile Co., Wilmington, Del., has awarded contract to E. R. Hall, 34 South Seventeenth Street, Philadelphia, for the erection of the initial building, two stories, 75 x 200 ft., at its proposed new works at Prospect Park, near Philadelphia. The entire plant is estimated to cost in excess of \$1,000,000, including equipment. Paul Du Pont heads the company.

An electric power plant, with installation to comprise three boilers, engine, generator and auxiliary equipment, will be erected by the Helvetia Milk Condensing Co., Highland, Ill., in connection with its new factory at Greensboro, Md.; a refrigeration system will also be installed. The main works will be one and two stories, 176 x 280 ft. C. H. Reynolds is manager.

The Georgia Technological Institute, Atlanta, Ga., is having plans prepared for a two-story and basement addition, 42 x 214 ft., to its mechanical building, to cost about \$90,000, including equipment. The first floor will be equipped as a machine shop and the second floor as a wood-working department. Prof. F. P. Smith, Department of Architecture, is in charge.

The Thaden Aeromobile Mfg. Co., Atlanta, Ga., has been incorporated with a capital stock of \$100,000 under Delaware laws by H. Thaden, Atlanta; L. B. Thaden and Henry G. Thaden, Washington, D. C., to manufacture aircraft, parts, etc.

The No Leak Piston Ring Co., Baltimore, has filed plans for the erection of a two-story brick plant, 16 x 70 ft., at 824 West North Avenue.

The Maryland Motor Machine Co., Frederick, Md., recently incorporated with a capital stock of \$250,000, has taken over the works of the Maryland Motor Co. and plans to include the manufacture of parts, etc., to its products. Charles H. Kehne, formerly president of the acquired interest, is head of the new company. Others interested are Roy Sharrar, who will act as treasurer, and Edwin T. Dickerson.

The Walker Machine & Foundry Co., Roanoke, Va., recently organized, has awarded a contract to the Virginia Bridge & Iron Co., Roanoke, for the construction of its new plant for the manufacture of special machinery. The initial building will be 60 x 100 ft. and is estimated to cost about \$14,000. The company has a two-acre site for the entire works. Charles M. Walker is president.

The Gulf States Steel Co., Gadsden, Ala., is said to be planning for the erection of a one-story addition, 60 x 220 ft., to be equipped as a nail mill and wire mill extension, 60 x 370 ft. The work is estimated to cost about \$200,000, including machinery.

The Stockham Pipe & Fittings Co., Birmingham, Ala., has awarded a contract to the Eagle Iron Works, Birmingham, for the erection of two additions to its plant to cost about \$75,000, including equipment.

The Standard Oil Co., Birmingham, Ala., is planning for the erection of a one-story machine shop and automobile repair works to cost about \$17,000.

The General Repair & Machinery Co., Union, S. C., has been organized to manufacture machinery and parts. A. C. Osteen and W. M. Withers head the company.

The American Sugar Refining Co. has awarded contract to Stone & Webster for the construction of a refinery at Baltimore, Md., including a boiler plant, warehouses and other miscellaneous buildings to make a complete unit. Work is expected to start about June 1 and the cost is estimated at about \$10,000,000. Charles T. Main, Boston, is the engineer in charge.

## Chicago

CHICAGO, April 5.

The Chicago, Burlington & Quincy has issued a list covering its tool requirements for the year and totaling in round numbers \$275,000. This is the first large railroad inquiry to make its appearance and if it is a sample of what the large Western lines will buy, good business in machine tools is assured. The list follows:

- One 18-in. x 42-in. motor-driven engine lathe.
- One 18-in. x 60-in. motor-driven engine lathe.
- Two 18-in. x 48-in. motor-driven engine lathes.
- One 18-in. x 54-in. motor-driven engine lathe.
- One 20-in. x 36-in. motor-driven engine lathe.
- One 22-in. x 60-in. motor-driven engine lathe.
- One 22-in. x 72-in. motor-driven engine lathe.
- One 24-in. x 96-in. motor-driven engine lathe.
- One 24-in. x 60-in. motor-driven engine lathe.
- One 24-in. x 72-in. belt-driven engine lathe.
- One 28-in. x 108-in. motor-driven engine lathe.
- One 28-in. x 84-in. belt-driven engine lathe.
- One 36-in. x 96-in. motor-driven engine lathe.
- One 36-in. x 96-in. belt-driven engine lathe.
- Two 16-in. x 48-in. motor-driven engine lathes.
- Five 16-in. x 36-in. motor-driven engine lathes.
- One 26-in. belt-driven universal turret lathe.
- One 20-in. belt-driven universal turret lathe.
- One 20-in. motor-driven universal turret lathe.
- Two 16-in. belt-driven universal turret lathes.
- One 21-in. motor-driven universal turret lathe.
- One 26-in. motor-driven universal turret lathe.
- One rapid production turret lathe with 7½-in. hole through spindle, rapid traverse on carriage and turret, equipped with a 22-in. four-jaw combination chuck; motor drive.
- One belt-driven universal screw machine with 15-in. swing over bed and 8-in. swing over cross slide.
- One brass-turning lathe, 18-in. swing, with turret head and thread chasing bar; belt drive.
- Two 20-in. brass-turning lathes with motor drive.
- One 22-in. brass-turning lathe with belt drive.
- Two single-end car axle lathes, 12 in. x 96 in., belt-driven.
- Two 32-in. back-geared heavy duty motor-driven shapers.
- Three 28-in. back-geared heavy duty belt-driven shapers.
- One vertical shaper with 12-in. stroke and compound table, motor drive.
- One 36-in. x 36-in. x 10-ft. planer with two universal heads on cross rail, motor drive.
- One 26-in. x 26-in. x 8-ft. belt-driven planer with one universal head.
- One 32-in. x 32-in. x 10-ft. belt driven planer with two universal heads.
- One 48-in. x 48-in. x 16-ft. open side planer with outside removable column, two heads on cross rail and one on main column; motor drive.
- One single-pulley drive universal milling machine; 12-in. swing; longitudinal feed, 30 in.; transverse feed, 10 in.; vertical feed, 19 in.
- One 42-in. vertical turret lathe with one swivel head on cross rail and one revolving side head; motor drive.
- One 42-in. vertical boring mill, belt drive.
- One car wheel boring machine with capacity to bore wheels 26 in. to 42 in. in diameter; belt drive.
- One 46-in. horizontal boring and drilling machine; belt drive.
- Two horizontal boring and milling machines with 4-in. bar and compound table; motor drive.
- Five bolt cutting machines of various sizes.
- Three car-bolt pointing machines, belt drive.
- Two motor-driven nut facing machines.
- One pipe nipple cutting and threading machine.
- Two 24-in. upright drills.
- One 5-in. upright heavy duty, high speed, motor-driven drilling machine.
- One 4-in. motor-driven upright drill.
- One upright motor-driven drill to drill 3-in. hole in solid steel.
- One motor-driven upright drill to drill 2½-in. hole in solid steel.
- One belt-driven upright drill to drill 2-in. hole in solid steel.
- One 60-in. motor-driven universal type radial drill.
- Nineteen grinding machines of various types.

Although no other Western roads have issued lists of late, the Atchison, Topeka & Santa Fe has bought a 66-in. x 60-in. x 40-ft. locomotive-frame planing machine, with four heads and reversible motor drive. This machine represents an investment of about \$30,000.

The general run of business continues fairly good, but large individual inquiries are rare. The Mid-West Engine Co., Indianapolis, is in the market for six automatic screw machines and other equipment. The Union Tool Co., West Chicago, is inquiring for four turret lathes.



Deliveries are unsatisfactory and are a source of even greater concern than heretofore because of threatening labor difficulties in one of the large Western machine tool centers. While numerous price changes continue in open lines and miscellaneous equipment, standard types of tools sold by exclusive agencies remain on about the same level. Here and there a single manufacturer has raised his prices, but as yet there have been no general advances. For example, one line of punch presses has gone up 15 per cent; a line of radial drills has risen 10 per cent; and a line of second-class engine lathes has advanced.

The American Car & Foundry Co. has purchased from the Chicago, Burlington & Quincy a tract, 266 and 370 x 1680 ft., at the northeast corner of Wood Street and the Chicago River, Chicago, and also the land on the west half of Canal B. This is one of the pieces of property on which the company will build a \$2,000,000 plant.

The McDonald Machine Co., manufacturer of automatic can machinery, 3207 Shields Avenue, Chicago, has purchased a tract, 520 x 627 ft., in South Racine Avenue, near Seventy-fifth Street, and will begin work at once on a one-story plant, 150 x 400 ft., to cost \$250,000.

The Gerrard Wire-Tying Machine Co., Inc., has leased a recently completed one-story building at 1942 South Laramie Avenue, Chicago, for 10 years. The structure, which is 80 x 650 ft., will house the company's machine shops and its executive and sales offices.

Radloff & Stokes, manufacturers of automobile radiators, 1464 South Michigan Avenue, Chicago, contemplate the erection of a factory on the southeast corner of Austin and Claremont avenues.

The American Brake Shoe & Foundry Co., Ninety-fifth Street and Cottage Grove Avenue, Chicago, has awarded a contract for three one-story additions, 120 x 120, 102 x 120, and 40 x 60 ft., respectively, to cost \$150,000.

The Advance Spring & Wire Co., manufacturer of coiled springs for automobile and furniture upholstery, 1749 Carroll Avenue, Chicago, has let contract for the erection of a two-story addition, 120 x 123 ft., to cost \$75,000.

The S. S. Ball Bearing Co., 2948 West Van Buren Street, Chicago, contemplates the erection of a plant, 56 x 103 ft., at the northeast corner of Colorado and Cicero avenues.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has let contract for the construction of a one-story tractor assembling plant at 2600 West Thirty-first Street, to cost \$237,000.

The new \$500,000 plant of the National Springs Products Co., Gary, Ind., is expected to be ready for operation in May. An addition is planned which will double the initial output. The site is Twenty-first Avenue and the Pennsylvania Railroad.

Philip Pfeil has purchased the machine shop of the Zouri Drawn Metals Co., Chicago Heights, Ill., and will engage in general machine shop work.

Shaw, Welch & Co., manufacturers of gray iron castings, Galesburg, Ill., will increase their capital stock from \$70,000 to \$160,000. It is planned to double the foundry capacity.

The Brunner Machinery Co., Peru, Ill., has been purchased by the Wills Mfg. Co., manufacturer of agricultural implements, Mendota, Ill. The Wills plant will be removed to Peru.

A fire on March 21 did \$20,000 damage to the foundry department of the Bettendorf Co., railroad car manufacturer, Bettendorf, Iowa.

The McInnerney Co., Council Bluffs, Iowa, has bought property on Fifteenth Street and First Avenue for the construction of a foundry and machine shops. The company, which is headed by Benjamin McInnerney, will engage in a general foundry business, specializing in parts for freight and passenger elevators.

The Davenport Machine & Foundry Co., Davenport, Iowa, has let contract for a structural steel erection plant, 60 x 120 ft.

The Denver Rock Drill Co., Thirty-ninth and Gilpin streets, Denver, Col., has completed plans for a \$150,000 addition.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Street, Chicago, has taken bids for a one-story addition, 47 x 100 ft., comprising a top floor on an existing building, to cost about \$25,000.

The Hobson-Miller Mfg. Co., Martinsville, Ill., has been incorporated in Delaware with capital of \$150,000 by Jay G. Hobson, Martinsville; and S. Huber Miller, Wilksburg, Pa., to manufacture special machinery.

Fire, March 27, destroyed a portion of the plant of the Twin City Forge & Foundry Co., Stillwater, Minn., with loss estimated in excess of \$100,000.

The Diamond Calk Horseshoe Co., Duluth, Minn., has taken bids for a new two-story building, 75 x 116 ft., at

Grand Avenue and Forty-sixth Street, to cost about \$50,000.

The Emerson-Brantingham Co., Rockford, Ill., manufacturer of agricultural implements, is having plans prepared for a one-story addition, 80 x 250 ft., to its foundry, estimated to cost with equipment about \$175,000.

The Dexter Washing Machine Co., Fairfield, Iowa, is having plans prepared for a one-story addition, 80 x 140 ft., to cost about \$30,000. D. O. Gaines is president.

The Hennepin Atomized Fuel Co., Security Building, Minneapolis, Minn., is having plans prepared for the erection of a new one and two-story crushing plant, 100 x 150 ft., to cost about \$150,000, including machinery, on Broadway, near Johnson Street.

The Western States Portland Cement Co., R. A. Long Building, Kansas City, Mo., is considering the erection of a new plant in the vicinity of Davenport, Iowa., to cost about \$2,000,000, including machinery.

## Cleveland

CLEVELAND, April 5.

Business with local machine tool dealers is quite active, but orders are almost entirely for one or two machines. The largest inquiry that has come out for some time is from the American Steel & Wire Co. for about 20 standard machines, mostly of a large type, for its Cuyahoga works. Buying will be done through the company's purchasing department in the Western Reserve Building, Cleveland. No railroad lists have been issued since the Nickel Plate Railroad sent out a fair sized list several weeks ago. It has not yet placed its orders.

Following another manufacturer of a similar line, the Warner & Swasey Co., Cleveland, April 1 marked up prices 5 per cent on its turret lathes and screw machines, the advance covering its entire line except brass working machines. It is stated that the recent rise in the price of castings will absorb the greater part of the advance in the price of this company's line of machinery.

The labor situation is again a troublesome factor in local machine shops, owing to the fact that with the arrival of spring many men are leaving the shops and seeking outside work. This is affecting the men who have been employed in the shops only a few months and not the old employees.

A new plant will be established in Cleveland by the International Metal Hose Co. to manufacture flexible metal tubing. Among those interested are William H. Miller, who will be secretary and general sales manager, and W. Phillip, chief engineer.

Loomis-Sieloff, 6616 Morgan Avenue, Cleveland, will erect a machine shop addition, 80 x 240 ft., and will add to their present line of work the manufacture of shock absorbers for automobiles.

The Superior Foundry Co., Cleveland, has purchased the foundry of the Vaham Foundry Co. on Union Avenue, near the Superior plant, which it will equip for the manufacture of automobile castings.

The Warner & Swasey Co., Cleveland, has increased its capital stock from \$3,000,000 to \$11,000,000 to take care of future expansion.

The Euclid Crane & Hoist Co., Euclid, Ohio, has increased its capital stock from \$10,000 to \$200,000 to take care of the growth of its business, no change in the amount of capital stock having been made since the company was organized a number of years ago.

The Sandusky Foundry & Machine Co., Sandusky, Ohio, has been reorganized, W. H. Millsbaugh having repurchased holdings he sold three years ago to Irving Brown and other Cleveland men. In the reorganization, Mr. Millsbaugh was elected president; W. C. Boyle, Cleveland, vice-president; Louis A. Stroh, Sandusky, treasurer, and F. S. Whitcomb, Cleveland, secretary.

The Bucyrus Copper Kettle Works, Bucyrus, Ohio, will enlarge its plant by the erection of an addition, 60 x 240 ft., which will be equipped for manufacturing candy-making machinery, copper kettles and other equipment. Its capital stock has been increased from \$50,000 to \$100,000.

The Non-Ferro Foundry & Pattern Co., Toledo, Ohio, has been incorporated with a capital stock of \$10,000 and has started a factory at 361 Bancroft Street for the manufacture of brass and aluminum castings.

The Oberle Tool & Die Mfg. Co., Toledo, Ohio, which is engaged in tool, die and general machine work in the Factories Building, has been incorporated with a capital stock of \$25,000. G. L. Oberle is president.

The Highways Motor Co., Defiance, Ohio, which has been organized to manufacture motors for passenger cars and trucks, has elected C. H. Kettenring, of the Defiance Machine Works, president; R. P. Kettenring, E. H. Bellnap,

J. W. Swartz, A. M. Pearson, vice-presidents and J. W. Wright, secretary and treasurer.

The Elyria Enameled Products Co., Elyria, Ohio, has increased its capital stock from \$500,000 to \$1,000,000.

The Goodyear Tire & Rubber Co., Akron, Ohio has commenced the erection of a one-story plant, 250 x 660 ft., for the manufacture of rims. Contracts for the building and equipment were placed some time ago, but the project was delayed and it was reported that the erection might be postponed.

The Wright Mfg. Co., Lisbon, Ohio, manufacturer of hoists, has acquired a site and contemplates the erection of a new manufacturing plant and foundry.

## Pittsburgh

PITTSBURGH, April 5.

The Fletcher Brothers Enamel Co., Dunbar, W. Va., is planning for the erection of a new plant for the manufacture of aluminum ware for household service. It is proposed to break ground at an early date. The company recently increased its capital stock by \$300,000.

The Libby-Owens Co., Kanawha City, W. Va., will build an addition to the power plant at its glass works to cost about \$50,000.

The Whitaker-Glessner Co., Wheeling, W. Va., manufacturer of corrugated iron products, steel specialties, etc., is arranging for an increase in its capital stock from \$7,000,000 to \$60,000,000.

The Nitro Paper Mills, Inc., Nitro, W. Va., recently incorporated with a capital stock of \$1,000,000, has acquired about 50 acres at the former works of the Government and will establish a plant for the manufacture of wood pulp, estimated to cost with machinery in excess of \$500,000. The company is headed by J. S. Cochran, of the Durham Paper & Pulp Co., Riegelsville, Pa.

The Reihl-Johnson Mfg. Co., Pittsburgh, has been organized to manufacture iron and steel specialties for marine service and to operate a general repair plant for marine work. The new works will be located on Third Avenue, at Block House Way. The company is headed by J. L. Reihl, R. Johnson and A. J. Cox, formerly connected with the Marine Mfg. & Supply Co., of this city. Mr. Reihl was mechanical superintendent at this plant.

The Central Railway Signal Co., First National Bank Building, Pittsburgh, has awarded a contract to the Dravo Construction Co., Diamond Bank Building, for the erection of a new plant at Versailles, Pa., to comprise two one-story shops, 65 x 80 ft. and 50 x 87 ft., estimated to cost about \$25,000.

Fire, March 22, destroyed a portion of the works of the Butler County Oil Refining Co., Bruin, Pa., with loss, including equipment, estimated at \$90,000.

The Hagerstown & Frederick Railway Co., Hagerstown, Md., is planning for the installation of new equipment at its power plant at Millville, W. Va. The extension will include a new steam turbine, 750-hp. boiler and other equipment. M. A. Pooler is general manager.

The Globe Automatic Sprinkler Co., Wheeling, W. Va., manufacturer of fire extinguishers, has filed plans for the erection of a one-story addition to its plant, 123 x 261 ft., to be equipped as a pipe shop. The building with equipment is estimated to cost about \$115,000.

A new electric power plant will be erected at a cost of about \$100,000 at the mills of the Interwoven Mills, Inc.; Martinsburg, W. Va. Headquarters of the company are at 390 George Street, New Brunswick, N. J.

The Penn-Mary Coal Co., Penn-Mary, Pa., an interest of the Bethlehem Steel Corporation, Bethlehem, Pa., is planning for extensions to cost in excess of \$500,000. New tipples will be erected, shops and mining plants established, with machinery to increase the output to about 1,500,000 tons per year.

The Pittsburgh Rolls Corporation, Pittsburgh, has filed plans for an addition to its plant at Williams and Forty-first streets to cost about \$50,000.

The Gillette Rubber Products Co., Pittsburgh and Cleveland, Ohio, has been incorporated in West Virginia with a capital stock of \$600,000 to manufacture automobile tires and other rubber products. C. O. Lund, A. M. Replogle and Simon Patterson, Frick Building, Pittsburgh; and Thomas S. Wilson, Cleveland, are the incorporators.

The Odin Construction Co., Titusville, Pa., manufacturer of boilers, tanks, stacks, etc., is planning for the erection of an addition to its plant on Monroe Street, to cost about \$60,000. H. A. Curtis is secretary.

The Pittsburgh Mining Machinery Co., Pittsburgh, recently chartered under Pennsylvania laws, has authorized

an increase of capital stock from \$100,000 to \$250,000. G. M. Crawford is secretary.

The Venango Bronze Metal Co., Franklin, Pa., with a capital stock of \$25,000, has been chartered under Pennsylvania laws to manufacture metals, castings, etc. F. J. Clark, W. E. Carmer and L. A. Arnold, all of Franklin, are the incorporators.

## Cincinnati

CINCINNATI, April 5.

Inquiries, principally for single machines, are steadily being received by machine tool manufacturers, and taken as a whole the number of orders placed during March was very little below those of January and February. There is considerable export inquiry before the market, principally from South America and the Far East. A local builder has booked an order through its New York office for a number of tools for Japan, and another maker has orders for India. Despite the exchange handicap, orders for several machines were received during the week from England, and orders from Belgium are looked for soon. A number of railroads have purchased single tools the past week, and it is reported that several lists now being made up will be issued shortly. Automobile interests are still purchasing tools and manufacturers of oil well machinery have been good buyers the past week. A number of crane inquiries are before the trade, and it is expected that orders will be closed the coming week. The Elmwood Castings Co., whose plant was recently damaged by fire, purchased three electric hoists, and it is expected that the Pennsylvania Railroad will purchase two cranes for Columbus, Ohio, within the next few days.

The Scott-Spencer Automatic Tool Co., Inc., Madison Road, Cincinnati, manufacturer of small tools, has increased its capital stock to \$40,000 and will enlarge its capacity three-fold. Work will start June 1 on a new plant especially designed to meet the requirements of its product. Tom J. Scott is president.

The municipality of Loveland, Ohio, through E. M. Chace, industrial engineer, will receive estimates until April 27 for the construction of a new electric light plant, the estimated cost being \$120,000.

The Weichman Pattern Co., Cincinnati, has been incorporated with a capital stock of \$10,000 by H. A., F. K. and A. M. Weichman and M. Sedgewick. It will operate a pattern shop.

The Miami Engineering Co., Dayton, Ohio, has been incorporated with a capital stock of \$50,000 by C. Barton, U. Yackley, A. D. Miller, J. E. Lockard and R. C. Juett.

The Dayton Malleable Iron Co., Dayton, has increased its capitalization from \$1,000,000 to \$1,400,000. It is understood that extensions to its plant are contemplated.

The Robert C. Byers Co., Columbus, Ohio, with a capital stock of \$50,000, has been incorporated by R. C. Byers, H. L. Taylor, H. W. Grout, H. S. Butler and Frank B. Wilson. The company plans to buy, sell and operate industrial plants. R. C. Byers is president.

The Williamson Heater Co., Cincinnati, has purchased additional property adjoining its plant in Oakley and is having plans prepared for the erection of two buildings, each 64 x 180 ft., two stories. Zettel & Rapp are the architects.

The John B. Morris Foundry Co., Cincinnati, has purchased additional property, 50 x 90 ft. and 25 x 90 ft. respectively, adjacent to its plant and is contemplating the erection of an extension to its foundry.

The Shartle Machine Co., Columbus, Ohio, has purchased property, 40 x 186 ft., adjoining its plant and contemplates the erection of an extension.

Fire which for a time threatened the entire plant with destruction caused damage of \$8,000 at the works of the Dayton Malleable Iron Co., Ironton, Ohio. The pattern storage building was completely gutted.

Plans are being prepared by Bodenstein & Surman, architects, Cincinnati, for new power equipment in the plant of the Herring-Hall-Marvin Safe Co., Hamilton, Ohio, which call for a new power plant, a new boiler room, and the motorization of the entire works. Approximately \$80,000 will be spent in new equipment.

The Arnold Tool Mfg. Co., Dayton, Ohio, has been incorporated with a capital stock of \$20,000 and will move from Main and Apple streets to the building formerly occupied by the Oldsmobile Co. at Edgewood Avenue and Middle Street. J. F. Arnold is president.

The American Can Co., 120 Broadway, New York, is having plans prepared for its proposed new plant on Spring Grove Avenue and Fergus Street, Cincinnati, estimated to cost about \$1,000,000, including equipment.

The Marietta Safe Cabinet Co., Marietta, Ohio, is com-

pleting plans for its proposed new plant, estimated to cost about \$2,000,000, including equipment. The works will comprise a number of buildings with total manufacturing space of about 500,000 sq. ft. The different structures will be used as a main metal working plant, assembly building, power plant, chemical works and research laboratory. R. H. Dick is vice-president and general manager.

The Universal Steel Co., Huron, Ohio, will soon call for bids for the erection of two additions to its plant. Headquarters of the company are in the Schofield Building, Cleveland. C. Simon is president.

The American Enameling & Stamping Co., Bellaire, Ohio, has awarded a contract to C. D. Keyser & Co., for a one-story addition, 108 x 255 ft.

## Indianapolis

INDIANAPOLIS, April 5.

The Leonard Tractor Co., Gary Ind., manufacturer of motor tractors, will soon call for bids for the erection of a one-story plant, 100 x 250 ft., on Griffith Street, to cost about \$100,000 including equipment. William Leonard, 524 Broadway, is president.

The Fort Wayne Tire & Rubber Mfg. Co., Fort Wayne, Ind., a Delaware corporation, has increased its capital from \$1,000,000 to \$2,500,000.

The Wawasee Tire & Rubber Co., Syracuse, Ind., with headquarters at Akron, Ohio, is planning for the erection of a new plant to cost about \$600,000, including machinery. E. W. Saltsman, Akron, heads the company.

The Kendallville Foundry Co., Kendallville, Ind., has awarded a contract to the Indiana Engineering & Construction Co., Fort Wayne, for the erection of two one-story additions, 110 x 140 ft. and 35 x 150 ft., to cost about \$30,000, and to be equipped as a foundry and pattern shop respectively. The company recently increased its capital stock to \$150,000. Henry W. De Bilius is president.

The Standard Wheel Co., North Thirteenth Street, Terre Haute, Ind., has awarded a contract to J. P. Minnick, 2045 North Eighth Street, for a one-story plant, 100 x 104 ft., at Thirteenth and Plum streets, to cost about \$25,000.

The Acme Aluminum & Brass Works, 420 South Harding Street, Indianapolis, is completing plans for a one-story addition, including new power plant, to cost about \$40,000.

The Richmond Air Compressor Co., Richmond, Ind., is taking bids for a one-story addition, 80 x 145 ft. Ebon Louck is president.

The Cummings Vote Register Corporation, Rushville, Ind., with \$1,000,000 capital stock, has leased a factory formerly occupied by the Modern Appliance Co. and will manufacture voting machines. Mrs. M. C. Schuessler, Indianapolis, is president of the company.

The Portland Forge & Foundry Co., Portland, Ind., has increased its common stock from \$100,000 to \$200,000.

The Olson Pneumatic Saw & Valve Co., Indianapolis, has been incorporated with \$20,000 capital stock. The directors are Charles J., Charles A. and Richard D. Olson.

The Ford Timer Co., Rotal Center, Ind., has been incorporated with \$50,000 capital stock to manufacture gas and power engines and parts. The directors are William B. Ford, Robert Dowling and G. G. Behny.

The Wyne Oil Tank & Pump Co., Fort Wayne, Ind., has increased its capital stock from \$1,000,000 to \$2,000,000.

The Pioneer Brass Works, Indianapolis, has increased its capital stock from \$70,000 to \$100,000.

The Byron Typewriter Cabinet Co., Louisville, will build a one-story factory, 70 x 150 ft., at 3201 Woodland Avenue, to cost \$22,000. Contract has been let to the C. A. Koerker Co.

## Detroit

DETROIT, April 5.

The Ewing Bolt & Screw Co., Farwell Building, Detroit, is arranging for the erection of a new one-story plant to cost about \$350,000, including equipment.

The Oldsmobile Motor Corporation, Lansing, Mich., will call for bids about June for the erection of an addition to its plant to be used as an axle works. With equipment it will cost about \$150,000.

The Leiber Mfg. Co., Detroit, a Delaware corporation, has changed its name to the Victor Screw Works, Inc.

The Kent Machine Co., Grand Rapids, Mich., is completing plans for a one-story foundry addition.

The Cardo Tool & Stamping Co., Jackson, Mich., is planning for the installation of new sheet metal working machinery.

The Baker Tractor Corporation, Dime Bank Building, Detroit, is arranging for the erection of a number of new assembling plants in different parts of the country. It is proposed to increase production during the present year to about 10,000 machines. Benjamin F. Mortensen is president.

The Lufkin Rule Co., Saginaw, Mich., manufacturer of steel tapes, rules, etc., has broken ground for a one-story addition, 115 x 220 ft., to cost about \$75,000, including equipment. Frederick Buck is president.

The Jackson Screw Products Co., Jackson, Mich., has awarded a contract to North & Griffen for a one-story addition, 50 x 120 ft.

The Clark Equipment Co., Buchanan, will erect a branch factory in Berrien Springs, Mich., for the manufacture of axles, provided the city will furnish a site. As now planned the first unit will be 50 x 100 ft.

The Premier Warm Air Heater Co., Dowagiac, has let contracts for its first unit, 120 x 300 ft., to be erected on a 6-acre site bordering the Michigan Central Railroad. The company was formed to manufacture a new patented pipe and pipeless furnaces. William F. Judd is president, Harry L. Wood, vice-president and general manager; Ralph S. McNaney, superintendent; C. C. Sinclair, secretary; Richard M. Judd, treasurer; Dr. William Cory, director, and F. Bruce Laing, director and counsel.

The National Engineering Co., Ltd., of Canada, a new organization, will locate in Sarnia and manufacture milk condensers and tire pumps. J. W. Lawrence is president and Willis A. Swan, Port Huron, Mich., vice-president.

Plans are now complete for the additions to the Pontiac plant of the truck division of the General Motors Corporation, which will double the capacity of the plant and bring the annual schedule up to 20,000. Additional factory units will be erected with a total floor space of 160,000 sq. ft. A machine shop, railroad sidings, shipping docks, and test houses are among the new facilities to be provided.

The American Furnace & Foundry Co., capitalized at \$100,000, has been organized and will locate in Milan, Mich. Plans call for a first factory unit, 75 x 200 ft. in dimensions.

The General Aluminum & Brass Co. has indefinitely suspended the construction of its new plant at Marysville, Mich.

## St. Louis

ST. LOUIS, April 5.

The St. Louis Felling Machine Co., Forest Park Boulevard, St. Louis, manufacturer of sewing machinery, has taken bids for the erection of a one-story addition, 60 x 175 ft., to cost about \$30,000. Charles L. Knower is president.

The Automatic Car Brake Co., St. Joseph, Mo., a Delaware corporation, has increased its capital stock from \$100,000 to \$2,000,000.

The Lehmann Machine Co., South Broadway, St. Louis, manufacturer of engine lathes and other machine tools, is completing plans for a two-story addition, 110 x 195 ft., to cost about \$450,000 including machinery.

The Crunden, Martin Mfg. Co., Second Street, St. Louis, manufacturer of tinware, etc., has awarded a contract to the Gamble Construction Co., St. Louis, for an addition to its plant at Second and Cedar streets, to cost about \$400,000.

The Bowen Motor Railways Corporation, St. Louis, recently organized to manufacture a gasoline-operated railway car, has acquired about 20 acres of land for its proposed new plant, plans for which are being prepared. A. D. Bowen is president; T. G. Travis, formerly of the Howard Stove Co., Omaha, Neb., is vice-president.

The Union Electric Light & Power Co., St. Louis, has arranged for a bond issue of \$2,500,000, to be used in part for expansion in plants and system.

Fire, March 23, destroyed a portion of the plant of the Constantina Refining Co., West Tulsa, Okla., with loss, including equipment, estimated at \$250,000.

The Fulton Iron Works, Delaware Avenue, St. Louis, has completed plans for a foundry addition to cost about \$100,000, including equipment.

J. P. Bradford, West Point, Ark., will re-equip his machine shop recently burned.

The Oklahoma Machine & Boiler Co., Muskogee, Okla., will equip a machine shop.

The Constantine Refining Co., New First National Bank Building, Tulsa, Okla., will equip a refinery with a daily capacity of 20,000 bbl.

The C. T. Whitman Lumber Co., H. A. Morrison and T. T. Whitman, Earler, Ark., will equip mills to cost about \$100,000 on recently acquired land in Louisiana.

The National Rock Asphalt Co., Ada, Okla., Bert Hahn,



president, is in the market for pulverizing machinery to cost about \$20,000.

The Foster Log Loader Co., Little Rock, Ark., R. C. Childs president, is reported in the market for about \$30,000 worth of machinery.

The United Fiber & Products Co., W. T. Larkin president, Fidelity Building, Baltimore, Md., has bought the Sugar Cane By-Products Co.'s mill at New Iberia, La., and will install \$150,000 worth of machinery to manufacture newsprint.

The Hannibal Rubber Co., Hannibal, Mo., W. J. Richards president, Hannibal Trust Building, will install \$150,000 worth of machinery for the manufacture of fabric and cord tires.

The Shelburne Motor Co., Oklahoma City, Okla., will equip a \$150,000 plant for the manufacture of motors.

## Milwaukee

MILWAUKEE, April 5.

Inquiry for machine tools is active and the volume of orders received is of satisfactory proportions, although the demand is of no particular feature and consists mostly of single tools and small lots. The marked decline in the building activity among metal-working manufacturers as well as other industries, due to high costs, will probably have an effect upon the prospects for large lot business, which is expected to be confined largely to railroads in the next few months. Some scattering buying of tools from the Government is reported from various sections of Wisconsin. The Marquette University, Milwaukee, has ordered equipment costing about \$50,000 from the Government for a proposed new engineering college to be erected at once.

The Master Tool Makers, Inc., Milwaukee, has been organized with \$20,000 capital stock to manufacture machine and manual tools, jigs, dies, etc. The incorporators are W. J. P. Aberg and Chauncey E. Blake, attorney, Madison, Wis.

The Milwaukee Ice Machine Co., 1001 Cold Spring Avenue, Milwaukee, which has been operating in leased quarters for the past year, will erect a plant. Plans are being made for a foundry and machine shop, but details are not yet available. It is capitalized at \$500,000 and makes self-contained refrigerating systems. Harry T. Schroeder is president and general manager.

Morris Brothers, Racine, Wis., manufacturers of brass and aluminum castings, have decided to relocate their operation in Fond du Lac, Wis., and have leased an existing building which is being remodeled.

The Montana Tractor Co., Tinley Park, Ill., has contracted with the Chamber of Commerce of Oconto, Wis., for the establishment of a new assembling plant to handle the Northwestern and Canadian business. Ground will be broken about April 15 for a one-story brick and steel building, 150 x 200 ft., at the junction of the Chicago & North Western and the Chicago, Milwaukee & St. Paul tracks. The investment will be \$150,000. C. H. Haight, vice-president, is in charge of operation.

The Holt Power Equipment Co., Milwaukee, has been incorporated with a capital stock of \$10,000 to manufacture and install electric motors and other industrial power systems. The incorporators are F. Maurice Holt, J. W. Schuler and Deane S. Holt, who is secretary of the Holt Electric Co., 377 South Pierce Street.

The A. J. Lindemann & Hoverson Co., Milwaukee, has awarded contract to Klug & Smith, consulting engineers, Mack Block, for designing and constructing additions to its stove and range works at First and Cleveland avenues. It recently increased its capital stock from \$200,000 to \$400,000. A. J. Lindemann is president.

The F. G. Strong Hardware Co., Eagle River, Wis., has plans for a two-story building, 50 x 110 ft., to be used as a public garage, machine shop and sheet metal works. It will cost about \$20,000.

The Jorgensen Mfg. Co., Waupaca, Wis., manufacturer of vapor priming devices for internal combustion engines, is preparing to build a brass and aluminum foundry and enlarge its machine shop to provide for the quantity production of a carburetor for motor vehicles and tractors. The capital stock has recently been increased from \$70,000 to \$350,000. The improvements will cost about \$125,000. C. H. Jorgensen is secretary-treasurer.

The Herken Hard Fibre Case Co., LaCrosse, Wis., has been organized by George, John J. and Harvey Herken and is equipping a factory at 212 Main Street for the manufacture of combination steel and composition trunks, suit cases, cabinets, etc.

The Hollister Automobile Co., 35 Algoma Street, Oshkosh, Wis., has engaged Julius F. Deger, local architect, to

design a two-story garage and machine shop, 80 x 121 ft., and will install additional equipment.

Doelger & Kirsten, 505-509 Cedar Street, Milwaukee manufacturers of alligator shears and other metal cutting devices, have broken ground for the erection of their new plant at Thirtieth and Chambers streets. It will be of brick and steel, with sawtooth roof, 90 x 205 ft., and cost \$65,000. With additional tools and other machinery the investment will be in the neighborhood of \$100,000.

The Milwaukee Press & Machinery Co., 129 Michigan Street, Milwaukee, formerly the Mechanical Equipment Co., has leased space at 339-341 First Avenue and is installing additional equipment for manufacturing punch presses and a line of tools, dies, fixtures and jigs.

Fred J. Jordan, Hartford, Wis., has opened a jobbing machine shop and will install lathe, milling machine, drill press, forge, etc., with individual electric motor drive. He has been connected with the tool and die department of the Kissel Motor Car Co. factory at Hartford.

The John Obenberger Forge Co., Fifty-third and Burnham streets, West Allis, has increased its authorized capital stock from \$250,000 to \$500,000. It manufactures crankshaft and camshaft forgings and other automotive parts and contemplates enlargement of its plant during the spring and summer. John Obenberger is president and general manager.

The Davis Mill & Electric Co., Galesville, Wis., will change its generating system from direct to alternating current and is contracting for new equipment and supplies. It furnishes current to the municipality and local industries, which also will require extensive changes.

The Claus Automatic Gas Cock Co., 1614 Boost Street, Milwaukee, which has increased its capital stock from \$25,000 to \$50,000, contemplates the erection of its own brass foundry. An architect will be selected at once and it is hoped to break ground about April 20.

The Taylor Motor Car Co., Eau Claire, Wis., has awarded contracts for a two-story brick and concrete public garage, machine shop and service building, 70 x 116 ft., which will cost about \$26,000 complete.

The Erickson-Young Pattern & Mfg. Co., Beaver Dam, Wis., has been reorganized following the retirement of Harry T. Young. It has adopted the new style of Erickson Pattern & Mfg. Co., and will continue to specialize in plate and machine molding work, wood and metal patterns. The officers are: President, James E. Erickson; vice-president, C. J. Larsen; secretary-treasurer, J. A. Schauer.

The Toy Co. of America, Appleton, Wis., has been organized with a capital stock of \$25,000 and will manufacture metal toys, specializing in miniature aircraft. C. L. Wiggin, formerly of Detroit, Mich., is president and general manager.

The Duplex Storage Battery Co., Milwaukee, operating since Jan. 1 in leased quarters at 637 Edison Avenue, contemplates the erection of its own plant in West Allis. The estimated cost of building and equipment is \$50,000. It will be 60 x 120 ft., two stories. Bids will be taken shortly.

The Board of Education, Bloomer, Wis., has accepted the bid of the Hoeppner-Bartlett Co., Eau Claire, Wis., to erect the new high school and vocational training institute at a price of \$146,300, not including plumbing and heating.

## The Central South

LOUISVILLE, April 5.

Thé P. Bannon Pipe Co., operating three brick plants in Louisville, suffered a \$50,000 fire loss on April 2. It will need new motors and a considerable part of the machinery will have to be replaced.

The New Albany Machine Mfg. Co., Henry H. Martin, Louisville, president, has purchased the buildings and lands which have been under lease for five years.

Prince Wells, Fourth Street and Broadway, Louisville, has purchased a site for a \$100,000 garage and machine shop.

Harry Venable, superintendent Peerless Mfg. Co., Fifteenth Street and Ormsby Avenue, Louisville, is in the market for punch presses for blanking, drawing, forming, etc.

The Cowherd-Foster Motor Co., Hopkinsville, Ky., has been incorporated with a capital stock of \$30,000 by S. L. Cowherd, L. A. Foster and others.

John Fields and Frank McKee, Lexington, Ky., are organizing a company for the establishment of a plant for the manufacture of convertible farm wagon bodies, estimated to cost with machinery about \$25,000.

The Woodburn Coal Co., Blackey, Ky., is planning for the erection of a coal tippie.

The Kentucky Rock Asphalt Co., Bowling Green, Ky., is planning for the installation of new machinery to double

the present capacity, making a total of about 1000 tons per day. The equipment will include new pulverizing apparatus, crusher, engine, boiler, etc. The company recently increased its capital stock from \$1,000,000 to \$1,500,000. S. O. LeSueur, Paul Jones Building, Louisville, is treasurer.

The O. B. Andrews Paper Mills Co., Chattanooga, Tenn., has completed plans for the erection of a new plant for the manufacture of paper board, to cost about \$125,000 including machinery. It will have a daily capacity of about 50 tons. O. B. Andrews is president.

The Atlantic Tank & Barrel Co., Louisville, Ky., is planning for the erection of an addition to cost about \$15,000.

## Texas

AUSTIN, April 5.

The machine shops of the Texas & Pacific Railroad at Big Springs, which were recently destroyed by fire, will be rebuilt on a larger scale.

The Liberty Light & Power Co., Liberty, has been incorporated with a capital stock of \$15,000. The incorporators are A. J. Riviere, B. G. Riviere and E. B. Pickett, Jr.

The Palestine Gin Co. will build a cotton gin at Palestine to cost about \$50,000. S. R. McMeans is a stockholder.

The Transcontinental Oil Co., Hodge, subsidiary of the Standard Oil Co., will construct a plant for handling the by-products of a 6000-bbl. oil refinery, at a cost of about \$1,000,000.

The Wright Brothers Boiler & Machine Co. has been incorporated at Ranger with a capital stock of \$75,000 by I. C. Rudman, C. A. Wright and S. E. Wright.

The Dallas Art & Novelty Co., Dallas, will erect a three-story factory to cost \$200,000, including equipment. Charles W. Hawley is president.

## The Pacific Coast

SAN FRANCISCO, March 30.

The Southern Pacific Railroad, 65 Market Street, San Francisco, is in the market for machinery for its shops on the coast, and it is also stated that it is about to purchase 100 locomotives of large type. A good demand for steam shovels has developed, but the call for general machinery shows a steady decrease.

In the Seattle district machinery manufacturers and dealers are doing a satisfactory volume of business, although inclement weather in many sections has brought about a quieter tone in the retail trade. Purchasing for immediate needs is fairly heavy, but there is a disposition to limit commitments for the future. This is believed to be due to the general opinion that prices have reached the top and readjustments downward may be looked for.

The Acme Gas Engine Co., San Francisco, has leased the building on Main Street, formerly occupied by the Main Iron Works, and will move its plant to the new location sometime in May.

The Western Metal Products Co., Alameda, has been incorporated with a capital of \$50,000 by Ferdinand Kretz, Henry W. Schnellby and John F. Hostrawser to manufacture bronze and aluminum products.

The Recilient Safe Wheel Co., Berkeley, Cal., has been incorporated with a capital of \$200,000 and the following directors: D. E., D. D. and G. A. Bohannon, all of Berkeley. It will establish a factory to manufacture wheels for aircraft and automobiles.

R. Berry, 2419 S Street, Sacramento, Cal., has filed plans for the erection of a one-story building at 1817 Twenty-ninth Street, to be equipped as an iron foundry.

The Electric Motor Lock Co., Los Angeles, has filed notice of organization to manufacture locking devices. C. B. Caldwell, 2869 West Eighth Street, heads the company.

The Snow Mountain Water & Power Co., Lockport, Cal., has been granted permission by the Railroad Commission to issue stock for \$1,500,000 for extensions and improvements in its electric power plant and system, to increase the capacity about 25 per cent.

The Concrete Machinery & Supply Co., 2014 Santa Fe Avenue, Los Angeles, has broken ground for a new one and two-story plant, 100 x 120 ft., on Santa Fe Avenue, for the manufacture of machinery and parts. A department will be used for the manufacture of concrete pipe forms. Norman Essick and L. N. Cleveland head the company.

J. T. Garrett, Woodland, Cal., has filed plans for the erection of a one-story foundry at Thirteenth and Poplar streets, Oakland, Cal., for the production of iron castings.

The Shaw Machine & Tool Co., 1122 Temple Street, Los Angeles, has filed notice of organization to manufacture

machinery, machine parts, tools, etc. E. H. Shaw heads the company.

The Rasmussen Machine Co., Whittier, Cal., has arranged for the erection of a one-story machine shop addition, 24 x 80 ft.

C. F. Rodin, 460 Twenty-ninth Avenue, San Francisco, has filed plans for the erection of a one-story metal-working shop at 250 East Tenth Street, near Harrison Street.

The Byron Jackson Iron Works, 336 East Third Street, Los Angeles, manufacturer of pumping machinery, is having plans prepared for a one-story, brick and concrete plant, on Slausen Avenue, near Santa Fe Avenue, 90 x 200 ft.

The Southern Sierras Power Co., Riverside, Cal., is planning for the erection of a hydroelectric plant on the Owens River, in the vicinity of Bishop, Cal., with a capacity of about 27,000 hp. With equipment it is estimated to cost in excess of \$1,000,000. The company will also build a number of smaller power plants and construction on one of these, on Bishop Creek, has been inaugurated.

The Motor Parts Mfg. Co., 741 South San Pedro Street, Los Angeles, has been organized to manufacture metal products, automobile parts, etc. James A. Northrup, 923 West Fiftieth Street, heads the company.

The McStay Machine Co., 3036 East Twelfth Street, Los Angeles, has filed notice of organization to manufacture machinery and parts. Walter M. McStay heads the company.

The Union Paper Box Co., Seattle, will equip a box manufacturing plant in a structure under erection on Lake Union at a cost of \$45,000.

The Oakridge Lumber Co., Eugene, Ore., plans the erection of a sawmill with a daily capacity of 35,000 ft.

The Edwards Lumber Co., Eugene, Ore., has completed plans for a sawmill with a daily capacity of 25,000 ft.

Boone & Lathrop, Boise, Idaho, will erect a one-story brick factory for reboring engines.

The Brattle Brothers Mill Co., Vancouver, Wash., has completed plans for the construction of a lumber plant costing \$100,000, with a daily capacity of 150,000 ft. It is capitalized for \$175,000.

## Canada

TORONTO, April 5.

Notwithstanding the continual advances reported from time to time on practically all lines of equipment, the general demand for machinery and tools shows no apparent falling off. While there is some improvement in deliveries, the supply is still considerably below the demand and dealers are unable to give any definite promise as to when new tools will be delivered. Several large foundries in Ontario are preparing to extend their plants and dealers look for good lists from this source. Automobile concerns and railroads continue to send out inquiries and lists.

The T. Eaton Co., 190 Yonge Street, Toronto, owner of the Guelph Stove Works, Guelph, Ont., has had plans prepared by W. A. Mahoney for an addition to the foundry, 80 x 200 ft. A new cupola will be built and considerable new machinery will be required. A new office building will also be erected. When the improvements are completed about 140 additional men will be employed.

The Commercial Motor Trucks, Ltd., the Canadian branch of the Commerce Motor Car Co., Ltd., Detroit, Mich., will establish a branch factory in Guelph and plans have been prepared for the erection of a plant. Construction will start within 30 days and operations are expected to begin next October. It is the intention of the company to purchase locally many of the parts which will be required for assembling the motor trucks. The directors of the Canadian company are: Walter E. Parker, E. M. Baker, Charles L. Granger, George D. Cox, all of Detroit, and J. M. Taylor, F. E. Pantridge and J. E. Carter, Guelph. The plant will be constructed on a site of 25 acres, opposite the Moncrief Furnace Co., on the York Road.

The Dunlop Tire & Rubber Co. is erecting a four-story reinforced concrete factory building at the corner of Booth Avenue and Queen Street. It was announced a few months ago that the company had put aside \$1,000,000 for additions and machinery. It has just increased its capital stock to \$10,000,000.

The Collingwood Shipbuilding Co. will make extensions and improvements to its plant at Kingston, Ont. It is proposed to construct a 750-ft. drydock and to also provide accommodations for repairing vessels.

J. L. Lemieux, for six years associated with Lymburners, Ltd., as mechanical superintendent, has opened the Modern Machine Works at 83 Bleury Street, Montreal, and will do general machine shop work. He will also be in a position



to take care of special work, such as the designing and building of machine tools, experimental work, etc.

The Ealton-Carlson Co., Ltd., St. Catharines, Ont., recently incorporated with a capital stock of \$400,000 to manufacture mechanics' tools and drop forgings, etc., is establishing a plant. Most of its machinery has been ordered, but it is expected to be in the market shortly for punch presses, drop hammers, etc. The officers are: A. T. Baker, president; Walter Carlson, vice-president; S. G. Walton, secretary and manager.

Eustace G. Bird, architect, 6 King Street West, Toronto, is receiving bids until April 26 for the erection of a manufacturing building at the corner of Wallace and Ward avenues, for the Canadian General Electric Co., Ltd.

Mr. Adams, 157 Pacific Avenue, Toronto, is in the market for a 400 to 500-hp. engine, Corliss preferred; also one locomotive crane with long boom.

The planing mill owned by C. B. Williams Co., 11 St. Albans Street, Toronto, was destroyed by fire with loss to machinery and equipment of \$25,000.

D. C. Cotten, 54 Adelaide Street East, Toronto, will prepare plans for an addition for the Willard Storage Battery Agency, 117 Simcoe Street. A. G. Strathy, Ltd., 123 Simcoe Street, is superintendent.

The Anthes Foundry, Ltd., 64 Jefferson Avenue, Toronto, will build addition to its foundry and install new equipment.

The Dominion Chair Co., Bass River, B. C., contemplates the erection of an electric light and power plant. R. Starratt is manager.

The Massett Timber Co., 744 Hastings Street West, Vancouver, B. C., is contemplating the construction of pulp and paper mills in British Columbia at a cost of \$1,000,000. F. S. Beckley is general manager.

The McFarlane Engineering Co., Paris, Ont., will convert its plant used during the war in the production of munitions into a grey iron foundry. There will be two cupolas with a production of 20 tons daily. The company also proposes to go into the manufacture of wood-working machinery, and certain lines of machine tools and specialties.

The Northern Crane Works, Walkerville, Ont., is in the market for a 30-hp. General Electric motor, three-phase, 60-cycle, 550-volt, 5011 frame.

H. J. Wilken, town clerk, Yellow Grass, Sask., is in the market for a 50-kw., direct current, compound wound generator, 110 to 125 volts, to be direct connected or belt driven, complete with rheostat and slide rails. Bids to be in by April 20. A used generator in good condition will be considered.

The Atlas Mfg. Co., Ltd., Port Arthur, Ont., has been incorporated with a capital stock of \$40,000 by Alexander C. Lotoski, Amos G. Allen, Walter L. MacGregor, and others to manufacture electrical supplies, machinery, etc.

The Omega Machinery, Ltd., St. Hyacinthe, Que., has been incorporated with a capital stock of \$200,000 by Joseph L. Champagne, Joseph E. Lussier, Eugene E. Gamache and others to take over the business now carried on under the name of the Omega Machinery Co., Ltd.

Hans Renold of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$25,000 by William H. Jackson of Manchester, England; Herbert George, Montreal; John M. Clark, 156 Yonge Street, Toronto, and others to manufacture hardware, machinery, castings, etc.

Bearing Metals, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Ernest L. W. Saunderson, Norman McL. Campbell, Aime S. Bruneau and others to manufacture machinery, tools, implements, etc.

Landers, Frary & Clark, New Britain, Conn., will soon install in the foundry an overhead carrier system capable of carrying in one operation 700 pounds of molten metal from the cupolas to the immediate vicinity of the molds, where the metal will be drawn for molds. At present the molders carry 60-lb. ladles from the cupolas to the molds. The new system is expected to materially increase production.

Frey, Brassert & Co., Chicago, have recently made installation of Steese patented tar and hydro-carbon burner equipment at the open-hearth furnaces of the National Enameling and Stamping Co. and the Tennessee Coal, Iron and Railroad Co.

Hartel Brothers & Co., 307 Atlantic Ave., Boston, steel jobbers, have purchased a plot of land at Brookline, Tudor and Emily streets, Cambridge, Mass., containing about 25,000 sq. ft., on which a modern warehouse will be built this year.

## OFFICE CHANGES

William S. Roe, factory, heating and plumbing supplies, Mechanic Street, Newark, N. J., will move May 1 to 15-31 River Street, Newark, N. J., where he will have larger and better facilities.

The Reading Chain & Block Corporation, Reading, Pa., is moving its New York office from 17 Battery Place to 93 Grand Street.

The increasing demand for hydraulic machinery that exists throughout the Buffalo territory has made it advisable for the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, to establish a branch office in the Mutual Life Building, Buffalo, in charge of R. K. Havlicek, who has for some time represented the company as a sales engineer working out of the home office in Mt. Gilead.

The Homestead Valve Mfg. Co., Homestead, Pa., announces the removal of its New York office to 242 Lafayette Street. The office is in charge of P. L. Rhodes, who has with him William Gormly, John Gormly, George Nagle, C. A.

The branch of the Herbert Machinery & Supply Co., Los Angeles, which has been located on Second and Natoma streets, San Francisco, has leased a new two-story and basement brick building, 55 x 75, now being erected on the corner of First and Mina streets, San Francisco, for showrooms and office. The building is expected to be ready for occupancy during June.

The Rome Metal Products Co. has moved its office from 150 Nassau Street to 23 West Forty-third Street, New York.

The Arthur C. Harvey Co. has removed its office from 374 Congress Street to 506 Cambridge Street, Allston, Mass. This is only a temporary location. The office eventually will be moved to the corner of Everett Street and Harvey Street Road, Allston, Mass.

To study the commercial phases of cargo handling machinery used on docks, terminals and on shipboard, the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has established a marine and terminal department in charge of H. W. Gledhill, formerly district manager of the Philadelphia office. Mr. Gledhill will continue to make Philadelphia his headquarters, but will spend much of his time in New York.

The United Smelting & Aluminum Co., New York, has established a branch office in the Woolworth Building, in charge of Ben. Rosenberg, to promote export trade.

The Hyatt Roller Bearing Co. has changed its New York office to Sixth Avenue at Forty-first Street.

The manufacturing sales department of the Wellman-Seaver-Morgan Co., which handles the company's sales of rubber equipment and machinery and which is in charge of L. N. Ridenour, moved on March 31 from the company's Akron office to its general offices at 7000 Central Avenue, Cleveland.

### Westinghouse Air Brake Company Report

The annual report of the Westinghouse Air Brake Co., Wilmerding, Pa., for 1919, was issued last week and will be submitted to the stockholders of the company at the annual meeting to be held April 15.

Net profits for the year ended Dec. 31 last were \$7,912,569, before consideration of Federal taxes. The latter are estimated at \$1,625,000, deducting which leaves a balance of \$6,287,569. Dividends paid during the 12 months amounted to \$4,072,491, leaving a balance to surplus of \$2,215,077. The total surplus as of Dec. 31, 1919, was \$14,879,629.

Preliminary estimates are that the gross earnings of Westinghouse Electric & Mfg. Co. for the year ending March 31, 1920, will be about \$135,000,000 compared with \$160,379,943 last year. Net income, before Federal taxes, will be around \$16,000,000 as against \$30,454,854 in 1919. Federal income and excess profits taxes will not come near the \$15,000,000 figure of last year, so that net earnings applicable to dividends will not be as far below last year's figure of \$15,059,008 as the difference in gross would indicate. It is believed a conservative estimate of net earnings after taxes would be \$12,000,000, or about \$8 per share on the \$74.812,650 stock (\$50 par value) as compared with \$10.06 last year.



## NEW TRADE PUBLICATIONS

**Flanges and Fittings.**—Reading Valve & Fittings Co., Reading, Pa. Catalog 1, 208 pages, 5 x 7 1/4 in., with cloth cover. Describes in detail fittings and flanges in both the flanged and screwed types. Standard and medium fittings are guaranteed for 250-lb. working pressure, and extra heavy fittings for 350-lb. working pressure and a total temperature of 800-deg. Fahr. The catalog is illustrated.

**Boiler Tubes.**—Parkesburg Iron Co., Parkesburg, Pa. A 32-page booklet, 8 x 10 1/4 in., dealing with charcoal iron boiler tubes. Discusses the development of charcoal iron and explains how the tubes are manufactured by the Parkesburg company. Views of processes in the manufacture, locomotives equipped with the tubes, and tables of sizes and weights of tubes are included.

**Reversing Motor Drives.**—General Electric Co., Schenectady. Bulletin 48029. Deals with an adjustable speed motor and control manufactured by the company as a reversing drive for planers, slotters, etc. Assembled and detail views of the motor and equipment, also views of the motor and control installed on machine tools are shown.

**Iron Cement.**—Smooth-On Mfg. Co., 570 Communipaw Avenue, Jersey City. Booklet, with the title "Smooth-On Home Repairs," explains how to repair leaks in boilers, stove pipes, radiators, furnaces, tanks, etc., with an iron compound which is supplied in powder form and applied after mixing with water to the consistency of putty.

**Boiler Makers' Tools.**—J. Faessler Mfg. Co., Moberly, Mo. Catalog of 68 pages devoted to a recently developed line of roller expanding and flaring tools for locomotive superheater tubes, locomotive arch tubes, stationary water tubes and marine boiler tubes. Special types of expanders are included for Stirling, B. & W., and Heine boilers. The catalog is illustrated.

**Gages.**—Greenfield Tap and Die Corporation, Greenfield, Mass. Catalog 43, 110 pages, 4 1/4 x 7 1/4 in. Concerned with an extensive line of gages and miscellaneous inspection equipment, including tools for gaging external and internal diameters, lengths, screws and tap holes; thread limit gages and checks, special thread gages, miscellaneous screw thread and gage inspection equipment. Information and tables of value as screw cutting and gaging data, graphic tolerance charts for use in establishing manufacturing limits, and complete gaging systems are included.

**Boiler Regulation.**—Hagan Corporation, Pittsburgh. Catalog, with the title "The Hagan System of Boiler Regulation," which operates to regulate in accordance with the steam flow rather than the steam pressure. An analysis of the two systems of regulation and the construction of the Hagan regulators are discussed in detail.

**Automatic Regulator.**—American Galco, Inc., 8 West Fortieth Street, New York. Pamphlet. Describes the Arca regulator for the automatic regulation of steam, gas, water, moisture, temperature, electric current, tension, etc. Views showing various applications of the regulator are included.

**Union Fittings.**—E. M. Dart Mfg. Co., Providence, R. I. Catalog. Illustrates and describes an extensive line of unions and flanges. The union coupling is made of malleable iron with a double-seated ball joint formed of bronze metal rings swaged into recesses made to receive them. This produces a union which requires no packing and is stated to be leak-proof. The flanges are also bronze to bronze seated.

**Superheaters.**—Locomotive Superheater Co., 30 Church Street, New York. Bulletin T-5. Presents engineering reasons for the advantages of superheated steam for stationary power plants.

**Coupling for Electric Drive.**—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 4041. Illustrates and describes a bushing type coupling intended particularly for electric drive.

**Combination Tiering Machine.**—Revolator Co., sales agents for New York Revolving Portable Elevator Co., 336 Garfield Avenue, Jersey City, N. J. Bulletin 53. Describes the revolator, a combination machine, hand or motor operated for tiering or stacking barrels, boxes, etc.

**Micrometer and Test Comparators.**—Golden Co., 405 Lexington Avenue, New York. Two catalogs. Catalog 230 illustrates and describes a high precision micrometer measuring 100 millimeters to the one thousandth of a millimeter, or 4 in. to 0.00005 in. Catalog 239 is concerned with test comparators for making comparisons to an accuracy of 0.001 millimeter or 0.00005 in. These instruments are made by the Société Genevoise D'Instruments De Physique, Geneva, Switzerland.

**Under-Feed Stokers.**—Under-Feed Stoker Co. of America, Book Building, Detroit. Catalog, 21 pages, 8 1/2 x 11 in.

Refers to applications of the Jones under-feed mechanical stoker to industrial heating furnaces, including applications to heating furnaces used with waste heat boilers, billet heating furnaces, annealing furnaces, forging furnaces for bars and billets, melting furnaces, etc.

**Special Last Machinery.**—Kimball Bros. & Sprague, Brockton, Mass. Catalog. Views and specifications of special last machinery, including lathes, press, trimmers, saws, cutters, etc.

**Triplex Power and Oil Line Pumps.**—Aldrich Pump Co., Allentown, Pa. Four bulletins as follows: Bulletin 37, vertical triplex power pumps of solid water-end type, for comparatively small quantities against pressures of 500 lb. and higher, for use about steel plants, boiler works, rolling mills, etc.; bulletin 55, deep well triplex power pumps of various water-end types; bulletin 60, vertical triplex power pumps of solid water-end type for general pumping requirements about mills, mines, etc.; bulletin 62, oil line pumps, quintuplex, triplex, horizontal or vertical.

**Polishing Machines.**—St Louis Machine Tool Co., 932 Loughborough Avenue, St. Louis. Folder. Illustrations and specifications of heavy polishing machines, also a self-oiling countershaft.

**Agitator Driving Yokes.**—Nickel Engineering Works, Saginaw, Mich. Bulletin entitled "Agitator Driving Yokes." Describes a standard power transmission device for driving agitator or stirrer shafts in chemical tanks and kettles. Illustrations show how the yokes are mounted on both open and closed containers. A table of standard dimensions is given.

**Power Factor Recording Instruments.**—Esterline Co., Indianapolis. Bulletin 395. Points out the evils of low power factor to the central station, the isolated plant and the power customer; also how to locate and eliminate the causes of low power factor. The company's power factor recorders are illustrated and described.

**Milling, Turning, Cutting-Off and Grinding Machines.**—Allied Machinery Co. of America, 51 Chambers Street, New York. Five bulletins devoted to the following subjects: Vertical milling and drilling machines, and light horizontal duplex milling machines with two spindles manufactured by W. B. Knight Machinery Co., St. Louis; standard engine lathes in sizes from 14 in. to 42 in. for manufacturing purposes, and tool room lathes with complete equipment, manufactured by American Tool Works Co., Cincinnati; lathe type double tool cutting-off machines built with constant speed cone and accelerated speed friction drive, manufactured by the Hurlbut, Rogers Machinery Co., South Sudbury, Mass.; a plain cutter and tool grinding machine which can be converted into a universal machine by the addition of attachments, manufactured by the Oakley Machine Tool Co., Cincinnati; universal grinding machines adapted to tool sharpening and special grinding, and a plain model for cylindrical and taper grinding, manufactured by Greenfield Machine Co., Greenfield, Mass. The bulletins are illustrated.

**Machinery and Tools.**—Brown & Sharpe Mfg. Co., Providence, R. I. Catalog 137, 609 pages, 3 1/2 x 5 1/4 in. Illustrations with descriptions of an extensive line of machinery and tools. These include milling, grinding, automatic gear cutting, and screw machines; cutters, accurate test tools and machinists' tools.

**Paint Products for Industrial Plants.**—U. S. Gutta Percha Paint Co., Providence, R. I. Catalog. Contains suggestions for identifying piping and other equipment, also describes paints and enamels for use on machinery, piping, side walls, ceilings, and cement floors, a white paint for protecting ceilings and walls in industrial plants where processes are employed and vapors arise that are destructive to ordinary paint, and a paint compounded from lead and zinc for outside use.

**Rubber Insulated Wire.**—Hazard Mfg. Co., Wilkes-Barre, Pa. Catalog. Concerned with railroad signal wire, lead incased underground cables, spiralweave cables, code wire; and lists an extensive line of bare and insulated wires and cables. Points in the manufacture of rubber insulated wire are discussed.

**Automatic Turret Lathe.**—Gisholt Machine Co., 1221 East Washington Avenue, Madison, Wis. Folder A.T.L.2. Gives a line drawing of a piece finished on a Gisholt 20-in. automatic turret lathe from a steel casting, also a picture of the machine finishing one of the two operations, with the time given for the piece complete.

**Multi-Cut Lathe.**—R. K. LeBlond Machine Tool Co., Cincinnati. Catalog, 34 pages, 8 1/2 x 11 in. Illustrations with descriptions of the company's multi-cut lathe. This is a semi-automatic lathe on which one or more facing and turning operations can be performed simultaneously, one operator running several machines. This lathe was described in detail in THE IRON AGE, issue Sept. 25, 1919, page 856.

# Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

## Iron and Soft Steel Bars and Shapes

Bars:	Per lb.
Refined iron, base price.....	4.75c.
Swedish bars, base price .....	20.00c.

## Soft Steel

$\frac{3}{4}$ to 1 $\frac{1}{2}$ in., round and square.....	3.52c. to 4.75c.
1 to 6 in. x $\frac{3}{8}$ to 1 in.....	3.52c. to 4.75c.
1 to 6 in. x $\frac{1}{4}$ to 5/16.....	3.62c. to 4.85c.
Rods— $\frac{3}{8}$ and 11/16 .....	3.57c. to 4.55c.
Bands—1 $\frac{1}{2}$ to 6 by 3/16 to No. 8.....	4.22c. to 5.75c.
Hoops .....	5.57c. to 5.75c.

## Shapes:

Beams and channels—3 to 15 in.....	3.47c. to 4.75c.
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## Angles:

3 in. x $\frac{1}{4}$ in. and larger.....	3.47c. to 4.75c.
3 in. x 3/16 in. and $\frac{1}{2}$ in.....	3.72c. to 5.10c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x $\frac{1}{2}$ in.....	3.52c. to 4.90c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x 3/16 in. and thicker.....	3.47c. to 4.85c.
1 to 1 $\frac{1}{4}$ in. x 3/16 in.....	3.52c. to 4.90c.
1 to 1 $\frac{1}{4}$ x $\frac{1}{2}$ in.....	3.57c. to 4.95c.
$\frac{3}{8}$ x $\frac{3}{8}$ x $\frac{1}{2}$ in.....	3.62c. to 5.00c.
$\frac{3}{8}$ x $\frac{3}{8}$ in. ....	3.67c. to 5.05c.
$\frac{3}{8}$ x $\frac{1}{2}$ in. ....	4.07c. to 5.85c.
$\frac{1}{2}$ x 3/32 in. ....	5.17c. to 6.55c.

## Tees:

1 x $\frac{1}{2}$ in. ....	3.87c. to 5.25c.
1 $\frac{1}{4}$ in. x 1 $\frac{1}{4}$ x 3/16 in.....	3.77c. to 5.15c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ x 3/16 in. and thicker.....	3.57c. to 4.95c.
3 in and larger.....	3.52c. to 4.80c.

## Merchant Steel

	Per lb.
Tire, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger.....	4.75c.
Toe calk, $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger.....	5.50c.
Cold-rolled strip (soft and quarter hard).....	12c. to 14c.
Open-hearth spring steel.....	7.00c.
Shafting and Screw Stock:	

Rounds .....	6.00c. to 7.00c.
Squares, flats and hex.....	6.50c. to 7.50c.
Standard cast steel, base price.....	15.00c.
Best cast steel.....	20.00c. to 24.00c.
Extra best cast steel.....	25.00c. to 30.00c.

## Tank Plates—Steel

	Per lb.
$\frac{1}{4}$ in. and heavier.....	3.67c. to 5.00c.

## Sheets

### Blue Annealed

	Per lb.
No. 10 .....	6.52c. to 7.80c.
No. 12 .....	6.57c. to 7.85c.
No. 14 .....	6.62c. to 7.90c.
No. 16 .....	6.72c. to 8.00c.

### Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20.....	7.80c. to 8.80c.	
Nos. 22 and 24.....	7.85c. to 8.85c.	9.80c.
No. 26 .....	7.90c. to 8.90c.	9.85c.
No. 28 .....	8.00c. to 9.00c.	10.00c.
No. 30 .....	8.10c. to 9.10c.	
No. 28, 36 in. wide, 10c. higher.		

## Galvanized

	Per lb.
No. 14 .....	8.25c. to 10.00c.
No. 16 .....	8.50c. to 10.25c.
Nos. 18 and 20.....	8.65c. to 10.40c.
Nos. 22 and 24.....	8.80c. to 10.55c.
No. 26 .....	8.95c. to 10.70c.
No. 27 .....	9.10c. to 10.85c.
No. 28 .....	9.25c. to 11.00c.
No. 30 .....	9.75c. to 11.50c.
No. 28, 36 in. wide, 20c. higher.	

## Pipe

### Standard—Steel

	Blk.	Galv.
$\frac{1}{2}$ in. Butt... —36 —19		
$\frac{3}{4}$ -3 in. Butt... —40 —24		
3 $\frac{1}{2}$ -6 in. Lap. —35 —20		
7-12 in. Lap. —25 —8		

### Wrought Iron

	Blk.	Galv.
$\frac{3}{4}$ -1 $\frac{1}{2}$ in. Butt —18 +2		
2 in. Lap..... —9 +9		
2 $\frac{1}{2}$ -6 in. Lap.. —11 +6		
7-12 in. Lap... +2 +20		

## Steel Wire

BASE PRICE\* ON NO. 9 GAGE AND COARSER

	Per lb.
Bright basic .....	8.00c.
Annealed soft .....	8.00c.
Galvanized annealed .....	8.50c.
Coppered basic .....	8.50c.
Tinned soft Bessemer .....	10.00c.

\*Regular extras for lighter gages.

## Brass Sheet, Rod, Tube and Wire

BASE PRICE

High Brass Sheet .....	28 $\frac{1}{4}$ c. to 29 $\frac{1}{2}$ c.
High Brass Wire .....	28 $\frac{1}{4}$ c. to 29 $\frac{1}{2}$ c.
Brass Rod .....	26 $\frac{1}{4}$ c. to 29 c.
Brass Tube .....	42 $\frac{1}{4}$ c. to 44 $\frac{1}{4}$ c.

## Copper Sheets

Sheet copper, hot rolled, 24 oz., 29 $\frac{1}{2}$ c. per lb. base	
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.	

## Tin Plates

Bright Tin	Grade	Grade	Coke—14x20	Primes	Wasters
	"AAA"	"A"			
Charcoal	14x20	14x20	80 lb...	10.80	10.55
			90 lb...	10.90	10.65
			100 lb...	11.00	10.75
1C...	\$15.50	\$13.25	1C...	11.25	11.00
1X...	17.75	15.25	1X...	12.25	12.00
1XX...	19.50	17.00	1XX...	13.25	13.00
1XXX...	21.25	18.75	1XXX...	14.25	14.00
1XXXX...	22.75	20.50	1XXXX...	15.25	15.00

## Terne Plates

	8-lb. Coating 14x20
100 lb. ....	\$9.35
1C .....	9.50
1X .....	10.50
Fire door stock .....	12.75

## Tin

Straits pig .....	65c.
Bar .....	70c. to 80c.

## Copper

Lake ingot .....	21c. to 22c.
Electrolytic .....	20c. to 21c.
Casting .....	19 $\frac{1}{2}$ c. to 20c.

## Spelter and Sheet Zinc

Western spelter .....	10 $\frac{1}{4}$ c. to 11 $\frac{1}{4}$ c.
Sheet zinc, No. 9 base, casks .....	14c. open 14 $\frac{1}{4}$ c.

## Lead and Solder\*

American pig lead .....	10 $\frac{1}{4}$ c. to 11 $\frac{1}{4}$ c.
Bar lead .....	11 $\frac{1}{4}$ c. to 11 $\frac{1}{2}$ c.
Solder $\frac{1}{2}$ and $\frac{1}{2}$ guaranteed .....	43c.
No. 1 solder .....	40c.
Refined solder .....	36c.

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb. ....	90c.
Commercial grade, per lb. ....	50c.

## Antimony

Asiatic .....	12 $\frac{1}{4}$ c. to 12 $\frac{1}{2}$ c.
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## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	35c. to 38c.
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## Old Metals

Business has quieted down again, awaiting the action of the new metal market as to prices. Dealers' buying prices are as follows:

	Cents Per lb.
Copper, heavy and crucible.....	16.75
Copper, heavy and wire.....	16.00
Copper, light and bottoms.....	14.50
Brass, heavy .....	10.75
Brass, light .....	8.00
Heavy machine composition.....	16.00
No. 1 yellow brass turnings .....	9.75
No. 1 red brass or composition turnings .....	12.75
Lead, heavy .....	7.75
Lead, tea .....	6.00
Zinc .....	5.50

